2018

Family And School Impact On Psychological Functioning From Childhood To Late Adolescence: A Longitudinal Study Of Rural Chinese Youth

Yang Yue
University of South Carolina

FAMILY AND SCHOOL IMPACT ON PSYCHOLOGICAL FUNCTIONING FROM CHILDHOOD TO LATE ADOLESCENCE: A LONGITUDINAL STUDY OF RURAL CHINESE YOUTH

by

Yang Yue

Bachelor of Science
Northwest University, 2009

Master of Social Work
University of South Carolina, 2011

Submitted in Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy in

Social Work

College of Social Work

University of South Carolina

2018

Accepted by:

Bethany A. Bell, Major Professor

Huong Nguyen, Committee Member

Kristina Webber, Committee Member

Robert L. Johnson, Committee Member

Cheryl L. Addy, Vice Provost and Dean of the Graduate School

DEDICATION

My Mother, Xun Zhang

For your unconditional love and unstoppable support

My Father, Fuqiang Yue

For your unwavering devotion and confidence in me

My Husband, Huaxi Zheng

For your patience and guidance throughout our enriching journey

ACKNOWLEDGEMENTS

I would like to gratefully and sincerely thank my advisor, Dr. Bethany Bell, for her guidance, understanding, support, and confidence throughout graduate school. She always has the best way to encourage me whenever I need it. I would not be where I am today without her. I would also like to thank the other members of my committee, Dr. Huong Nguyen, Dr. Kristina Webber, and Dr. Robert Johnson, for their valuable input.

I am forever grateful for unfaltering love and support I continue to receive from those who are dearest to me. To my mother, thank you for believing higher education was in my future, and encouraging me to pursue it across the Pacific Ocean. I have been difficult through the years, but you have always loved and wanted what was best for me. To my father, thank you for teaching me to think critically, to be resilient and positive. Your confidence in me has been steadfast which making it impossible for me to lose confidence in myself. To my in-laws, Chongsu Zheng and Yang Zhuang, since Huaxi and I embarked on our journey, you have always provided care, guidance, and support. I will never be able to pay you back but I will do my best to pay it forward.

Huaxi, without you, I could not have succeeded. Thank you so much for always being there for me, offering love, wisdom, reassurance and encouragement, even on those days when I did not deserve it. You are my constant source of strength and happiness when challenges were overwhelmed and seemed never-ending. Thank you for reminding me that life is always worth living and living well during these past several years. As I am

stepping into another stage of life, I can't wait to experience many more sweet days, exciting trips, and fantastic adventures together.

ABSTRACT

The transition from childhood to adolescence can be a significant stressor for youth, leading to increases in internalizing problems for those who are vulnerable. Compared to the mounting research conducted on U.S. youth, children and adolescents in China have received less attention on their psychological adjustment. As Chinese youth constitute roughly 15% of the world's population (World Health Organization, 2010), and the disproportionate quantity of longitudinal investigation on Chinese youth psychological functioning, understanding the influence of risk and protective factors, and their interactive effects on internalizing problems among Chinese youth is critical.

According to Life Course Theory, Ecological Systems Theory, and Risk and Resilience Framework, we need to look beyond one snapshot, one risk or protective factor and analyze the interactions among multiple factors nested in multiple environments across time. Unfortunately, the longitudinal investigation of perceived family and school experiences on youth psychological functioning in rural China is rare. Thus, this study investigated four research questions: 1. What is the nature of internalizing problems among rural Chinese youth? 2. Are gender and perceived school experiences associated with internalizing problems in childhood among rural Chinese youth? Are they associated with changes in internalizing problems from childhood to late adolescence among rural Chinese youth? 3. Do perceived parental behaviors moderate the effect of gender on internalizing problems in childhood among rural Chinese youth? Do perceived parental

behaviors moderate the effect of gender on changes in internalizing problems among rural Chinese youth? 4. Do perceived parental behaviors moderate the effect of school experiences on internalizing problems in childhood among rural Chinese youth? Do perceived parental behaviors moderate the effect of perceived school experiences on changes in internalizing problems among rural Chinese youth?

This study used data from Wave I (2000) to Wave III (2007) of the Gansu Survey of Children and Families, which is one of the first projects to obtain data at the individual and village levels in four waves from 2000 to 2009 in rural China (Gansu Survey of Children and Families [GSCF], 2010a). The time-varying dependent variable was internalizing problems measured by a summative scale adapted from the Child Behavior Checklist and Youth-Self Report. The Level-1 time-variant predictor was youth age. The Level-2 time-invariant predictor was child gender, and the Level-2 time-variant predictors included perceived parental warmth, lack of teacher support, and adverse classroom climate. Research questions were examined using two-level growth curve models with time nested in individuals. All multivariate data analyses were conducted using PROC MIXED in SAS v9.4.

The results showed that on average levels of internalizing problems decreased over time among rural Chinese youth from childhood to late adolescence. In addition, youth gender was not associated with internalizing problems, there were no differences between boys and girls in childhood in internalizing problems nor were their differences between boys and girls in changes in internalizing problems. As for perceived lack of teacher support and adverse classroom climate, both had positive effects on childhood internalizing problems. Youth who reported less lack of teacher support and adversity in

their classrooms were predicted to have lower levels of internalizing problems. In addition, teacher support was also related to changes in internalizing problems from childhood to adolescence. Youth who reported more lack of teacher support were predicted to have a steep downward trajectory of internalizing problems in the developmental period examined, which indicates the effect of lack of teacher support is more detrimental in childhood compared to adolescence. Furthermore, parental warmth moderated the relationship between lack of teacher support and childhood internalizing problems. Lack of teacher support had a less impact on internalizing problems in childhood when youth perceived higher levels of parental warmth. Also, parental warmth moderated the relationship between adversity in classroom and changes in internalizing problems from childhood to adolescence. Adverse classroom climate had a less impact on the internalizing problems trajectory when youth perceived higher levels of parental warmth. The current investigation adds to the literature by examining the unique and interactive effects of individual characteristics, family and school experiences on internalizing symptoms from childhood to late adolescence. Results of the current study emphasize the importance of fostering responsive and supportive relationships within the family and school contexts early on and continually. Social workers in China have the potential to engage large teachers, students and school personnel to promote changes in rural school contexts and consult parents on strategies to improve family context. Social workers in China are also well positioned to advocate for national mental health policies that recognize and address mental health problems among rural youth.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Statement of the Problem

Internalizing problems have not been largely recognized in traditional Chinese culture, wherein individual psychological well-being is considered less important than the welfare and interests of the collective (Chen & Li, 2000). However, Chinese people are not spared from mental health disorders. According to Global Burden of Disease Study in 2015, 4.2% and 3.1% of total population in China suffered from depressive and anxiety disorders, respectively, including youth aged 15 to 19 (WHO, 2017c). In a cross-national study in seven countries, Verhulst et al. (2003) found that adolescents aged 12-18 years in China scored much higher in the anxious/depressed domain of internalizing problems compared to U.S. adolescents, and above the mean compared to five other countries, including Australia, Israel, Jamaica, the Netherlands, and Turkey. Unfortunately, sharply contrasted with the amount of research conducted in the U.S. and other developed countries, very limited comprehensive studies on youth psychological adjustment, in particular internalizing problems, have ever been conducted in Mainland China. Nevertheless, there have been several attempts to understand youth depressive and anxiety symptoms in metropolitan areas of China, and these studies indicate that despite cross-cultural differences exist in experiences of internalizing problems, it is a global crisis that have substantial influence on youth health and development, with the detrimental effects

affecting not only childhood or adolescence but also adulthood (e.g., Greenberger, Chen, Tally, & Dong, 2000; Yi, Wu, Chang, & Chang, 2009). It is noted that it is crucial to assess not only clinical emotional disorders but also the presence of mild, enduring internalizing symptoms that might lead to functional impairment and a more severe disorder in the future (WHO, 2016). Thus, in the current study, internalizing problems refers to the presence of depressive and anxiety symptoms.

Rural youth across the world are vulnerable to the deleterious effects of cumulative adversity on mental health outcomes. A majority of Chinese children and adolescents, who account for over 14.8% of the total world population (WHO, 2010), reside in deprived rural areas (The United Nations Children's Fund, 2013). Children and adolescents in poor rural communities experience more day-to-day deprivations and stressors than urban youth (Davidson & Adams, 2013; Hannum & Adams, 2008), and they often grow up in families with financial constraints and attend schools with limited resources to devote to the psychological development of youth. Taken together, these circumstances might translate to more internalizing problems among rural youth. Given the salience of the abundant stress experienced by rural youth beyond the individual level in the realms of family and school, it is essential to understand both the ways in which contextual adversity affects psychological adjustment and potential factors that promote resilience for this population.

Considering that internalizing symptoms often emerge in childhood and persists into adolescent years (Merikangas et al., 2010), there is a continued need for longitudinal studies to better understand how internalizing problems change over time among rural Chinese youth. Yet extant research was limited to cross-sectional data that did not seize

changes in trajectory of internalizing problems over the course of development. To address this gap, this study improved upon prior research by applying two-level Growth Curve Models to data from a longitudinal panel to investigate internalizing problems trajectory among youth in rural China. In doing so, the effects of multiple risk and resilience factors in individuals on the trajectory were investigated. The findings from this investigation provide insights into the processes by which internalizing problems evolve among rural Chinese youth and how individual differences unfold during childhood to late adolescence. In addition, the results of the current study provide implications for community and school social work practice and policy in China, as social workers there are playing more critical roles in promoting family and school experiences than before. Policies to support positive home and school climate in rural China in relation to sustainability and economic support are also needed.

Purpose

The current study had four key purposes: 1) To examine changes in the trajectory of internalizing problems from childhood to late adolescence among rural Chinese youth; 2) To examine if the trajectory of internalizing problems from childhood to late adolescence among rural Chinese youth differs by gender and perceived school experiences; 3) To determine if perceived parental behaviors moderate the relationship between gender and trajectory of internalizing problems from childhood to late adolescence among rural Chinese youth; 4) To determine if perceived parental behaviors moderate the relationship between perceived school experiences and internalizing problems trajectory from childhood to late adolescence among rural Chinese youth.

Study Rationale

The rationale for the current study is rooted in a number of understandings that are established in the current literature base. Life course theory (Elder, Johnson, & Crosnoe, 2003), ecological system theory (Bronfenbrenner, 1979) and risk and resilience framework (Rutter, 1979) combined were employed in current study, because they are well-known perspectives for organizing the influences of multiple sources of stress and resource in individuals and surrounding contexts on psychological adjustment over life span. Thus, to study human development effectively, we need to look beyond one single environment, one snapshot, one risk or protective factor and analyze the interactions among multiple factors nested in multiple environments across time. The *Mental Health Gap Action Programme Intervention Guide* emphasizes that "the quality of home and social educational environments influence children's and adolescents' wellbeing and functioning", and "exploring and addressing psychosocial stressors along with opportunities to activate supports" is critical to youth mental health (WHO, 2016, p.69).

In a quest to understand factors associated with youth psychological outcomes, researchers have focused on individual and family characteristics, as well as on social and environmental influences. The current study focused on the positive dimension of parenting practices as it exerts a significant influence on many youth developmental outcomes even when negative influences of other social contexts (e.g., school-level, community-level, or culture-level circumstances) are taken into consideration (Davidson & Adams, 2013; Galambos et al., 2003). McLeod and colleagues (2007a, b) have conducted two meta-analyses of more than forty studies (45 studies on youth depression and 47 on youth anxiety) on the impact of parenting practices on youth internalizing

outcomes. The two studies showed that exposure to inept parenting practices, including lack of support or rejection by a parent, put youth at risk of psychological malfunctioning, whereas having parents displaying of consistent responsiveness and sensitivity to youth's socioemotional and developmental needs and demands has been linked to youth mental well-being (McLeod, Weisz, & Wood, 2007a; McLeod, Wood, & Weisz, 2007b). Although parenting practices and their effects on offspring might vary across diverse cultural backgrounds (Lamborn & Felbab, 2003), a number of empirical studies in a Chinese context suggest that warm, supportive or nurturing relationships with parents buffer against youth internalizing problems, especially for children and adolescents living in rural deprivation (e.g., Davidson & Adams, 2013; Liu, 2003).

Beyond the parenting literature, an increasing number of studies support the potential of school-level characteristics to predict individual psychological outcomes during childhood and adolescence. Examples of significant school characteristics related to youth psychological adjustment include school classroom climate and teacher support (Kuperminc, Leadbeater, & Blatt, 2001; Reddy, Rhodes, & Mulhall, 2003). Importantly, these contextual characteristics have been found to be applicable to Chinese youth psychological functioning (Adams & Hannum, 2016; Davidson & Adams, 2013; Yang et al., 2013).

However, the longitudinal investigation of individual, family and school influences simultaneously on internalizing problems among rural Chinese youth is rare, and the examination of parenting behaviors as moderators of individual gender and school influences on the internalizing problems trajectory among rural Chinese youth appears to be non-existent. In addition, among studies in which individual, family, and school

impacts have been examined longitudinally, most did not take into account the nested structure of the data. Consequently, results from these studies do not delineate how much variation in the psychological outcome of interest is related to age or developmental stage, and how much is related to differences in individual characteristics. Given only knowing the onset of internalizing problems among rural Chinese youth is insufficient, there is a need to understand how problems change over time to better understand mechanisms that maintain or inhibit the problems.

Statement of Potential Significance

This study offers three contributions to the current literature on youth internalizing problems. The current study includes a longitudinal and less-studied sample in a developing country that allowed for an assessment of growth trajectory of internalizing problems among rural Chinese youth over time. This study contributes to our understanding of the dynamic relationship between individual, family, school effects, and their relative influences on the trajectory of youth internalizing problems. The current study employs the appropriate statistical method, i.e., multilevel growth modeling, to address the longitudinal and hierarchical nature of the data, and contributes to the limited number of psychological development studies among Chinese youth that have used multilevel modeling.

Further, the current study offers potential practical contributions. Besides the potential to advance scholarship, policymakers and social workers in China could be better informed by this study as they continue to work towards promoting youth mental well-being. Mental health of youth is in the best interest of the community as healthy youth go on to be adults who contribute positively to society. This research might call for

coordinated efforts between ecological systems that touch children's lives to promote health and wellness. This includes school-level interventions, community-level interventions, and interventions in the home. From a prevention perspective, identifying early and ongoing predictors of increasing internalizing problems over the early life course is important because continually internalizing problems during childhood and adolescence is predictive of adult mental health problems (WHO, 2017c). Identifying those at risk can facilitate interventions that reduce the continuity of internalizing symptoms before a chronic course of symptoms is established. The current study could provide implications for social workers in China looking to widen intervention efforts to target broader family and school contextual influences. This is critical as Chinese social workers are increasingly counted on to intervene at multiple intertwined levels beyond the individual level to improve youth outcomes.

Research Questions

1. What is the nature of internalizing problems among rural Chinese youth?

    1.1. What is the average level of internalizing problems in childhood? Is there variation in internalizing problems among rural Chinese youth in childhood?

    1.2. How do internalizing problems change from childhood to late adolescence? Does change in internalizing problems vary among rural Chinese youth?

2. Are gender and perceived school experiences associated with internalizing problems in childhood among rural Chinese youth? Are they associated with changes in internalizing problems from childhood to late adolescence among rural Chinese youth?

3. Do perceived parental behaviors moderate the effect of gender on internalizing problems in childhood among rural Chinese youth? Do perceived parental behaviors moderate the effect of gender on changes in internalizing problems among rural Chinese youth?

4. Do perceived parental behaviors moderate the effect of school experiences on internalizing problems in childhood among rural Chinese youth? Do perceived parental behaviors moderate the effect of perceived school experiences on changes in internalizing problems among rural Chinese youth?

Consistent with past literature, we hypothesize that youth will vary in their internalizing problems scores during childhood and in their change rate of internalizing problems. Additionally, there will be a positive relationship between being girls, experiencing lack of teacher support and adverse classroom climate, and internalizing problems in childhood and change rate in internalizing problems. Specifically, we hypothesize that parental warmth moderates the relationship between gender, school experiences, and internalizing problems in childhood, as well as internalizing problems trajectory. We hypothesize perceived parental warmth buffers the impacts of being girls, and experiencing lack of teacher support and adverse classroom climate on youth internalizing problems and the trajectory.

Structure of the Dissertation

The remainder of this dissertation follows in four chapters. Chapter 2 offers an overview of Elder's life course theory (2003), Bronfenbrenner's ecological system theory (1979), and Rutter's risk and resilience framework (1979), followed by a review of the literature regarding gender, parenting practices, and school influences on youth

internalizing problems trajectory. Chapter 3 provides a discussion of the research method, including a description of the data sources, study sample, measures, and data analysis. Chapter 4 describes the results yielded from the data analysis. Finally, Chapter 5 offers a discussion of the results of the research, including limitations of the study, implications for the field, and directions for future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter provides an overview of the three theoretical perspectives, life course theory (Elder et al., 2003), ecological systems theory (Bronfenbrenner, 1979), and risk and resilience framework (Rutter, 1979) that guided the study, followed by a synthesis of research that has addressed the influences of youth gender, parenting practices, and school experiences on youth internalizing problems trajectory. The chapter concludes with a summary of significant individual and contextual attributes that have been identified in the U.S. and Chinese literature.

When possible, the information presented in this chapter is limited to studies in the U.S. and the greater China areas (including Hong Kong and Taiwan, which share a similar cultural background with Mainland China) that rigorously examined individual attributes and contextual influences on youth internalizing problems and the trajectory of internalizing problems. This decision was made because the number of validated studies on youth psychological development in Mainland China is on the low side, especially when such studies are compared with those in Western contexts (Yue, 2017). There are several possible factors leading to this observed phenomenon. First, the foundation of social science and youth psychological development is weak in China. An unbalanced

development of the research in the social sciences in education exists between Western countries and Mainland China (Healy, 2008). Following the communist party takeover in 1949, all social sciences were banned from Chinese universities by 1952, labeled capitalist subjects. For almost 30 years, there was no contact between China and world, relating to social science (Healy, 2008). Second, there is a common belief among Chinese that children and adolescents will "automatically" grow up and will "naturally" grow out of internalizing problems if they have any (Shek & Yu, 2011). Third, internalizing problems, such as depression and anxiety, in Chinese adults and youth are often obscured by stigma, misconceptions, and shame (Kleinman, 1986). As such, the effort spent on youth mental health is insufficient. Finally, the spirit of evidence-based research and practice is just at its beginning stage in China. As commented by Shek and Yu (2011), the emphasis on evidence-based research and practice in China was far from enough. The combination of historically political constrains and cultural beliefs undermine the development of youth mental well-being research in China.

Given American society represents wide ethnic/racial, socioeconomic, geographic, structural and cultural diversity and exerted tremendous influence on the Chinese society and academic community, including conceptualization of psychological adjustment (Liu, 2009), studies on U.S. children and adolescents are chosen to be compared with research on Chinese youth regarding internalizing problems trajectory and its attributes. Although there is large amount of variation between China and the U.S. in terms of sociopolitical status and economic-cultural contexts, and that findings from U.S. are not generalizable to the population of interest in the current study, these studies provide significant resources to represent the issue on a global scale. Therefore, in an effort to compensate for the

limited literature conducted on Chinese youth, and to present the most relevant research related to youth internalizing problems, this chapter is limited to China and U.S. based studies to the extent possible.

Theoretical Framework

Human development is a dynamic process, influenced by innate characteristics and life experiences. The current study is informed by three theories of human development: Life Course Theory (Elder et al., 2003), Ecological Systems Theory (Bronfenbrenner, 1979), and Risk and Resilience Framework (Rutter, 1979).

Life course theory. The life course theory is a theoretical orientation with particular relevance to the study of human development and mental health (Elder et al., 2003). Rather than being a static, trait-like phenomenon, internalizing problems vary depending on multiple factors including developmental stage, personal resources, life experiences, and social location (Merrell, 2013). Within and across stages in the life course, individuals are confronted with potential developmental transitions and developmental change. Developmental transitions entail movement into or out of a social role, such as graduating from school. Developmental change entails transformations within an individual, such as children's social network changing from parents to peers. In order to assess developmental transitions and change, it is necessary to study the same group of individuals over an extended period of time. Longitudinal panel studies are a key feature in life course research.

There are five paradigmatic principles of the life course perspective: agency, linked lives, time and place, life-span development, and timing (Elder et al., 2003). The principle of agency may, to some extent, reflect various psychosocial theories (e.g.,

Bronfenbrenner's ecological system theory), which presume that individuals are the active agents of their behaviors and decisions are made within the opportunities and constraints of history and social environment. It is assumed that individuals' choices or the adaptive strategies used can have important implications for their mental health. The principle of linked lives refers to the interdependency of lives and how the social and historical context influences the network of these shared relationships. This principle encompasses the importance of the individual experiencing multiple social relationships across the life span. Also, linked lives resemble the interpersonal level of influence in the ecological models, for which both of them point to the possibility of using different possible intervening units, for example, family, school, and networks of friends. The principle of time and place explains how the life course is shaped by the experience of historical events and geographical locations. The novel contributions of the life course perspective in mental health promotion are the tenets that human development and aging are lifelong processes (i.e., the principle of life-span development), which start from birth and continue throughout the whole life, and that the determinants and impacts of events and transitions vary as a function of their timing in life (i.e., the principle of timing). The principle of life-span development connects the past to the present, and emphasizes that development is a continuous process. Given life course theory examines development over time and includes the reciprocal relationship between the individual and the environment (Elder et al., 2003), framing the current study from life course perspective allows for an examination of role of linked lives, including youth, parents, teachers, and peers in rural China, individual trajectory from childhood to late adolescence, and the interactions between them.

Bronfenbrenner's ecological systems theory. Social work has a unique perspective from other disciplines in that youth development is considered in the complexity of the social contexts in which youth navigate. Additionally, given that social work practice in China is expanding to involve not only intervening at the individual unit but also with larger settings that impacts youth outcomes, a broader theoretical perspective that encompasses multiple settings is helpful. Bronfenbrenner's theoretical model (1979) provides a way to conceptualize and understand the array of potential influences on youth outcomes.

Bronfenbrenner's theory embraces the person-in-environment perspective and examines the interactions between individuals and their environment (1979). That is, the biological and psychological systems of the individuals act in combination with the social systems of the family, school, community, and society in which they live. The positive environments around youth have the chance to cultivate overall healthy child and adolescent development, whereas the disruptions and instability in environments have the opportunity to inhibit healthy development, especially in the primary settings (i.e., family, community, and school) in which youth's psychological adjustment is developed. In addition, the theory also highlights that the individual is an active participant in environmental interactions. For youth who are developing within a complex system of relationships, their biological and intrapsychic characteristics also influence the attitudes and behaviors of others towards them.

According to Bronfenbrenner (1979), individuals exist among four interrelated systems – the *microsystem*, the *mesosystem*, the *exosystem*, and the *macrosystem*. The layer of the environment closest to the developing youth is called the *microsystem*. The

system is composed of influence from youth's immediate surroundings such as families, schools, neighborhoods, and peer groups in which an individual is active. The next layer, the *mesosystem*, comprises the connections between the components of youth's *microsystem*. For example, negative peer influences in school impacting relationships with family members, and parental rejection causing a child to have behavioral problems at school, and difficult relationships with teachers and peers. The *exosystem* is a larger social system in which the youth does not directly interact; however, it impacts the individual through an interaction with a component of the *microsystem*. Examples of *exosystem* level influences for youth include government policy and funding for school that impact youth school access. The *macrosystem* is the broadest level of an individual's environment and is composed of the values, cultures, laws, beliefs, and policies of their context. For example, son preference in Asian countries contributes to sex-selective abortion and excess female mortality in very early life (Attane, 2009). The effects of the *macrosystem* are felt throughout the other systems. Each system has a significant impact on not only each other but also on individual development (Bronfenbrenner, 1979).

Given family and school are the most important and immediate contexts to Chinese youth (Yi et al., 2009), the current study focuses on the interrelations of these two different microsystems within the mesosystems, that is the interaction between family and school contexts in relation to development trajectory. Instead of examining the influence of a single environment or a static developmental point, the current study examines the influence of two contexts on youth psychological adjustment over three time points from childhood to late adolescence among rural Chinese youth.

Risk and resilience framework. Internalizing problems are often understood from a risk and resilience framework that is informed by an ecological systems perspective (Rutter, 1979). Childhood through adolescence represents a crucial transition point characterized by multiple biological, developmental, and social changes. This developmental period is a time of turmoil and adjustment, contributing to the risk of initial onset of internalizing problems (Graber & Sontag, 2009; Kessler et al., 2001). A better understanding of the factors that place youth at risk for psychological malfunctioning and of those factors that moderate such negative influences can help guide the development of interventions designed to promote the positive development of youth, particularly for those facing challenging environments.

Although important gains have been made in identifying factors that place youth at risk for internalizing problems, much less progress has been made in identifying resilience factors (Davidson & Adams, 2013; Substance Abuse and Mental Health Services Administration, 2015). One issue that has complicated efforts to identify risk and protective factors has been the lack of consistent definitions regarding the mechanism by which they produce their effect. In this study, risk factors are defined as "any influences that increase the chances of harm or, more specifically, influences that increase the probability of onset, digression to a more serious state, or maintenance of a problem condition" (Fraser et al., 2004, p. 14), whereas resilience factors are defined as "both internal and external resources that modify risk" (Fraser et al., 2004, p.28), which alter the trajectory from risk exposure to negative outcome.

Youth development is the dynamic interplay between risk and protective factors whereby risk factors predispose individuals to negative developmental outcomes, and

protective factors increase resiliency. Although some youth residing in disadvantaged environments seem to do less well, many children and adolescents are resilient and doing well. There is growing interest in understanding ways to reduce the negative effects of risk factors on youth psychological adjustment. Considerable research with large school- or community samples shows that high levels of parental warmth (including listening, providing praise, affection, empathizing, trust, warm involvement, respect, and responsiveness) are protective factors for internalizing problems among youth (Cornwell, 2003; Needham, 2008). Further, interest in the social determinants of internalizing problems, or what features of the broader social context in which children and adolescents are embedded affect their risk for internalizing problems, has increased in the past decade. Although schools are gaining more interest from social science researchers recently, research on the role of schools in youth internalizing problems is lacking outside of a small number of studies. These studies, which have primarily focused on school socioeconomic status, ethnic/racial composition, and school climate, have shown that each of these elements are associated with internalizing problems among students (Goodman, Huang, Wade, & Kahn, 2003; Kuperminc et al., 2001; Reddy et al., 2003; Walsemann, Bell, & Maitra, 2011). However, it remains unclear whether the parental warmth received in family context is effective in diminishing effects in the association between perceived lack of teacher support, perceived adverse classroom climate and internalizing problems in Chinese context. Accordingly, the current study aims to address this gap. The following section presents the hypothesized model to be tested in this dissertation and the empirical literature that informs the model.

Conceptual Framework

Based on a review of the risk and protective factors for youth internalizing problems, individual, family, and school dimensions were selected and categorized within the relevant ecological systems level and risk and protective conceptualization. The conceptual model to be tested in the current study is depicted in Figure 2.1. Consistent with life course theory (Elder et al., 2003), ecological systems theory (Bronfenbrenner, 1979), and risk and resilience framework (Rutter, 1979), internalizing problems trajectory is hypothesized to be directly influenced by gender and perceived school experiences; perceived parental behaviors is hypothesized to moderate the relationship between these factors and internalizing problems trajectory. In the current study, perceived lack of teacher support and adverse classroom climate were used to conceptualize school experiences; parental warmth was used to conceptualize the positive dimension of parenting practices; being female was used to conceptualize as a "risk" factor for internalizing problems in rural China. These dimensions were drawn from previous literature and are particularly relevant to youth psychological adjustment in the area examined.

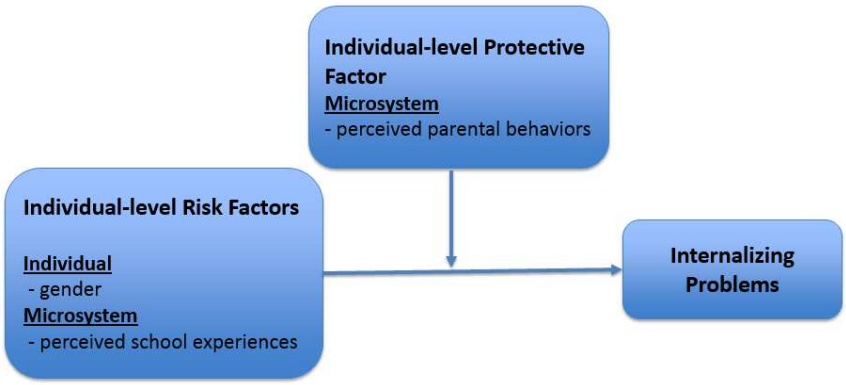


Figure 2.1 Conceptual framework of hypothesized relationships among individual-level risk and protective factors, and internalizing problems trajectory.

Longitudinal Trajectory of Internalizing Problems

Previous studies in the U.S. that have focused on identifying the trajectory of internalizing problems from childhood to adolescence have revealed a mixed picture due to different informants and nuances in developmental stage examined (Galambos et al., 2004; Letcher et al., 2009; Montague, Cavendish, Enders, & Dietz, 2010). For example, Letcher and colleagues (2009) identified the trajectory of internalizing problems among 1,684 youth from 3 to 15 years old. Parents reported that most boys and girls exhibited decreasing level of internalizing problems over time. Another study examined internalizing problems trajectory from late childhood through late adolescence by following a school sample of predominantly minority youth (Montague et al., 2010). Teachers indicated adolescents exhibited a decrease in internalizing problems between ages 12 to 19 years (Montague et al., 2010). In contrast, Galambos et al. (2004) found levels of depressive symptoms increased by youth self-report across the sampled four-year period (1994-1998) among the youngest cohort aged 12 to 13 in 1994. Overall, research indicates that internalizing problems occur at a lower rate in childhood (Hammen & Rudolph, 2003), but increase to incidence rates of approximately 2% to 8% by age 15 (see reviews by Lewinsohn & Essau, 2002; Zahn-Waxler et al., 2000).

Previous research on internalizing problems among Chinese children and adolescents have identified factors related to the onset of depression and anxiety in youth in cross-sectional studies (Greenberger et al., 2000; Yu & Seligman, 2002), but little research has studied a longitudinal course of internalizing problems from childhood into late adolescence. One longitudinal study in Taiwan examined the development of depressive symptoms from early to late adolescence by following a cohort of adolescents

over a 6-year period (Yi et al., 2009). Assessments of depression were obtained by youth self-report at ages 13 through 18. Findings from the six-wave repeated measure analysis of variance indicated that rates of depressive symptoms increased from ages 13 to 15, and 17 to 18, but decreased from ages 15 to 17.

Gender Differences in Internalizing Problems Trajectory

Gender plays a critical role in the development of internalizing problems. Using the National Comorbidity Survey Replication Adolescent Supplement, Kessler and colleagues (2012) found that among 13 to 17-year-old, girls presented with significantly higher 12-month prevalence and 30-day prevalence of mood disorders. In cohort samples of 9 to 16 years old, girls were significantly more likely than boys to experience the onset of depression and anxiety disorders in later adolescence (Costello et al., 2003). Two longitudinal epidemiological studies suggested that the gender difference in internalizing problems began to emerge in early adolescence with a continued increase into late adolescence. For example, in a nationally representative sample for 10 years among New Zealand youth aged 11 to 21, Hankin et al. (1998) found small gender differences in rates of depressive disorders between ages 13 to 15, with girls' rates slightly greater than boys', and the greatest differences began to be evident between ages 15 to 18. Similarly, using Canada's National Population Health Survey across a four-year period, Galambos and colleagues (2004) found that among youth aged 12 to 19 years old, adolescent girls reported more internalizing problems than adolescent boys. A small-scale longitudinal study on rural youth in Iowa found girls showed a linear increase in depressive symptoms from 8th to 12th grade, whereas boys showed a decline in symptoms between 7th and 9th grade, and then an increase from 10th to 12th grade (Ge, Conger, & Elder, 2001).

Consistent with findings on gender difference in Western countries, adolescent girls exhibited greater severity as well as more rapid development in internalizing problems from childhood to adolescence (Cohen et al., 2015; Wang, Chan, Lin, & Li, 2015; Wu et al., 2010; Yang, Soong, Kuo, Chang, & Chen, 2004). Traditional preference among Chinese parents for boys over girls might play a role in explaining these findings. Son preference is deeply rooted in the Chinese culture and is still prevalent in the contemporary society. It resulted from the patrilineal clan system, which can be traced back to Confucius more than 2,000 years ago (Short, Zhai, Xu, & Yang, 2001). In China, as well as other Asian countries under the great influence of Confucius values, sons are deemed the ones who can carry family lines and receive family inheritance (Short et al., 2001). Son preference combined with the one-child policy has driven up the sex ratio in China during last three decades. Sex ratios at birth, males born per hundred females born, are about 105 in populations where no human intervention is occurring (United Nations Population Fund [UNFPA], 2012). The nationwide trend in sex ratio at birth was normal (106) at the beginning of the 1970 but has increased substantially after the implementation of one-child policy and reached a historical high of 120 in 2005 (UNFPA, 2012). In Gansu, estimates showed normal sex ratios at birth in 1981 (106), elevated sex ratios in 1989 (111), and extremely elevated sex ratios by 1999 (119) (Lai, 2005).

In conditions of extreme poverty, son preference is expressed through the excess mortality of females aged 0-4 years by sex-selective abortion and baby girls abandonment (Attane, 2009). Further, in conditions of general poverty, son preference becomes manifest through limited investments in girls' nutrition, health and education, resulting in marked gender differentials in childcare and healthcare (Choi & Hwang, 2015; Song & Burgard,

2008), as well as educational attainment (Connelly & Zheng, 2003). Regarding psychological adjustment, rural girls are still considered one of the most powerless and understudied social groups in contemporary China. Fortunately, there are several attempts in understanding personality traits among rural girls. Researchers found that rural girls are more likely to feel isolated, anxious, and depressed than rural boys and urban children in general; they were also sensitive to changes, tended to withdraw, and lacked confidence (Fu & Fu, 2002; Wang, Lu, Zhang, & Chen, 2007). In a qualitative study with rural girls, Wang (2003) reported that a little girl said she wants to be a boy, because her brother can go to school and does not have to do the house chores. Given traditional cultural preference for sons and consequently investing more resources in sons has contributed to the cultural denigration of girls, to illiteracy and to the inescapable impoverishment of women as they grow older in rural China, understanding the trajectory of internalizing problems among rural girls and boys from childhood to late adolescence and factors that influence the trajectory is critical.

The Association between Parental Warmth and Youth Internalizing Problems

Considerable research with large community samples in both countries shows that high levels of parental warmth (including listening, providing support, encouragement, affection, empathizing, trust, warm involvement, respect, and responsiveness) are protective factors for internalizing problems among children and adolescents (Davidson & Adams, 2013; Galambos et al., 2003; Liu, 2003; Needham, 2008). Recent meta-analyses have provided robust evidence that youth have fewer internalizing problems when parents show nurturing, support, and reassurance toward offspring, and are sensitive and available to children's needs (McLeod et al., 2007a; McLeod et al., 2007b). On the other hand, a

lack of parental warmth is associated with increased levels of depressive symptoms and anxiety (Bayer, Sanson, & Hemphill, 2006; Dallaire et al., 2006; Letcher et al., 2009).

Longitudinal studies show particularly compelling evidence that low levels of parental warmth predict youth's psychological maladjustment including depression and anxiety over multiple time points (Colarossi & Eccles, 2003; Cornwell, 2003; Needham, 2008; Rueger, Chen, Jenkins, & Choe, 2014; Rueger, Malecki, & Demaray, 2010). For example, Cornwell (2003) examined the effects of changes in social support on depressive symptoms over a one-year period with adolescents in grades 7 to 12 participating in the National Longitudinal Study of Adolescent Health (Add Health). Higher levels of parental warmth were associated with lower levels of depressive symptoms one year later, such that a 25% increase in initial levels of parental warmth resulted in a 2.7% decrease in depressive symptoms over time. Growth in parental warmth over time was also significantly associated with declines in depressive symptoms, whereas decrease in parental warmth over time was related to increases in symptoms (Cornwell, 2003). Similarly, Needham (2008) investigated the relation between parental warmth and depression during the transition from mid adolescence to young adulthood. Using three waves of the Add Health adolescents' self-reports on depressive symptoms and parental warmth, the study revealed that parent warmth during adolescence was inversely associated with initial symptoms of depression (Needham, 2008). Overall, adolescents who experienced increases in levels of depressive symptoms over time also reported lower levels of parental warmth as young adults (Needham, 2008). Similar results have also been found by Rueger and colleagues (2010) in a longitudinal analysis of social support in early adolescence. It reported that levels of parental warmth measured throughout one school

year were predictive of the levels of depressive symptoms, anxiety, and self-esteem. Accordingly, the relation between parenting and youth development may be best conceptualized as a transactional process between parents and youth in which the development of the child is seen as the product of dynamic transactions between the child and his/her context (Sameroff, 2010).

Parental warmth may be important in reducing the association between negative school experiences and internalizing problems, because parents who are perceived supportive or responsive might be more likely to be approached for help in solving their children's problems or conflicts with teachers or peers (Perren & Hornung, 2005). Findings from emerging research demonstrate that parental warmth is effective in protecting peer victimized youth from internalizing problems. For example, Rigby (2000) investigated the cross-sectional associations among peer victimization, perceived overall social support, and mental health in a large sample of adolescents aged 12 to 16 years. Peer victimization was measured by self-reports for four subtypes of victimization: verbal (e.g., being teased or called hurtful names), relational (e.g., being left out of things on purpose), physical (e.g., being kicked or hit), and being threatened with harm. Overall levels of social support were assessed by adolescents' reports of how much help they thought they would receive from their parents, teachers, and friends if they were experiencing serious problems at school. Mental health was assessed using self-reports of somatic symptoms, anxiety, social dysfunction, and depression. Adolescents who experienced frequent peer victimization and who had low overall levels of social support were at greater risk of poor mental health compared to those with high overall levels of social support. Adolescents also indicated that support was more likely to be available

from parents than from teachers and classmates. Although these results provided evidence for the protective effect of parental support on peer victimization and poor mental health, the moderating effects of parental warmth on other aspects of school experiences, such as lack of teacher support and adverse classroom climate (not limited to peer victimization), were not examined.

Although parenting practices and their effects on offspring may vary across diverse cultural backgrounds (Lamborn & Felbab, 2003), parental warmth has meaning in Chinese culture that is similar to its meaning in the West (Ho, 1986; Lau, Lew, Hau, Cheung, & Bernt, 1990). Parental warmth is defined in terms of emotional support, caring, concern, affection, kindness and tenderness in Chinese context (Ho, 1986). A number of empirical studies among Chinese youth suggested that warm or supportive relationships with parents buffer against youth internalizing problems, especially for children and adolescents living in poverty. For example, in a study of rural children using Wave II of GSCF, parental warmth was found to be a beneficial factor for youth living with cumulative poverty-related adversities, such as chronic illness or dying of family members, poor academic performance, and peer conflicts at school (Davidson & Adams, 2013). Similarly, in urban areas of China, it has been reported that parental care and responsiveness to children emotional needs contribute to youth concurrent psychological well-being (Chen, Li, Li, Li, & Liu, 2000; Chen et al., 2003) and later adaptive functioning (Chen, Liu, & Li, 2000). Despite increasing research efforts devoted to understanding the effects of parenting on Chinese youth outcomes, scarce research has focused on those in rural China even though more youth reside in rural than urban areas. Take Gansu for example, 68% of its population resides in rural areas (National Bureau of

Statistics of China, 2016). Considering parents in rural China tend to have lower levels of education and wealth, and rear more than one child, there is a need to examine the level of parental warmth and influence of parental warmth on youth mental health problems.

Although the role of parental warmth is clear, gender-specific differences are less obvious. The gender differences in the frequency of internalizing problems can be traced back to variations in parenting, and the same parenting practices might function differently by gender (Scaramella, Conger, & Simons, 1999). For example, McKee et al. (2007) found that relative to girls, boys experienced less parental warmth and harsher verbal/physical discipline, with both types of discipline contributing to their internalizing problems. In contrast, there were several studies finding the level of parental warmth was similar for both boys and girls (Demaray & Malecki, 2003; Malecki & Demaray, 2003; Rueger, Malecki, & Demaray, 2008). In addition, Kim et al. (2005) found that lax parenting contributed to internalizing problems in girls and externalizing problems in boys, whereas overreactive parenting predicted externalizing symptoms in girls and internalizing symptoms in boys. Though receiving similar levels of maternal warmth, Ge et al. (1994) found that maternal warmth moderated the negative impact of life changes among adolescent girls more so than for boys.

Research in China has suggested that rural parents' long-term expectations of economic and emotional support from their children differ by gender, with higher expectations of such support from sons because of the parents' reliance on sons for support in their old age (Hannum, Kong, & Zhang, 2009), but it is unclear whether these differential expectations affect Chinese parents' rearing practices of boys and girls, particularly in parental warmth. In the traditional Chinese culture, which still prevails in

rural areas nowadays, "girls are encouraged to be dependent, relationally oriented, and successful in domestic affairs, whereas boys are socialized to be independent, economically successful, and become a strong financial source of support to the family later on" (Chen & Liu, 2012, p.486). It would be important to investigate whether these differential cultural expectations in gender socialization translate into variation in parental warmth of boys and girls. Furthermore, because it is common for daughters choosing or being chosen to sacrifice in times of financial hardships in traditional Chinese culture (e.g., daughters have to drop school to work or get married to support their original families and male siblings to continue education), daughters would be more susceptible to parenting practices because they have given too much to the family (Shek, 2005). To shed light on the extent to which cultural factors play a role in gender differences in child rearing, this study examined variations in the relationship between child gender and youth internalizing problems by accounting for the effect of perceived parental warmth.

School Experiences and Youth Internalizing Problems

As school-aged children and adolescents spend at least half of their waking hours in schools, schools present a critical setting for developing youth. Patterns of activities and interpersonal relationships experienced by the individual in the immediate context such as the classroom or the school directly affect the individual (Bronfenbrenner, 1979). Negative school experiences have been offered as an explanation for youth psychological maladjustments, such as lack of teacher support and adverse classroom climate (Kuperminc et al., 2001; Loukas & Robinson, 2004).

Children in China spend a great deal of time in school, due to long school days (7 am – 5 pm at least). China's "homeroom" teacher system in which, normatively one

teacher takes primary responsibility for shepherding a defined class of students throughout their time at the school, indicates that this teacher and group of class peers are likely to be particularly salient to youth school experiences (Adams & Hannum, 2016). Compared to students in U.S., students in China spend more time studying together and have more opportunities for social interactions with teachers (Chen, Greenberger, Farruggia, Bush, & Dong, 2003) and classmates (Jia et al., 2009). Due to the data availability of this secondary analysis as well as evidence from previous research (e.g., Reddy, Rhodes, & Mulhall, 2003; Watkins & Aber, 2009), "negative" school experiences, i.e., perceived lack of teacher support and perceived adverse school climate, were examined.

Perceived lack of teacher support. For some students, the relationships with educators are among the most meaningful in their lives (Anderson, Christenson, Sinclair, & Lehr, 2004; Chen et al., 2003). Teacher support refers to ongoing warmth and trust, united with open communication, instructional support, and positive involvement, which assists youth in developing internal representations of relationships with teachers (Reddy et al., 2003). On the other hand, lack of teacher support is commonly characterized by perceived indifference and unfair treatment from teachers, and having hardships to get along with teachers, which is associated with increased levels of internalizing problems (Reddy et al., 2003).

Ample studies have shown low level of teacher support is positively associated with psychological maladjustment (e.g., Joyce & Early, 2014; Reddy et al., 2003). For example, in a longitudinal sample of 2,585 students followed from 6th to 8th grades, Reddy and colleagues (2003) found that students who reported decreasing levels of teacher support corresponded with increases in depressive symptoms. Further, in a cross-

sectional study of a nationally representative adolescent sample in grades 7-12, Joyce and Early (2014) found youth with lower perceptions of teacher support were associated with more depressive symptoms. Besides poor psychological adjustment, Way et al. (2007) and Wang (2009) have demonstrated that less support from teachers led to more disruptive behaviors among youth. Beyond these, an extensive review of the literature by Davis (2003) showed a range of positive youth outcomes as a result of nurturing and supportive teacher–student relationships. These positive outcomes included higher educational attainment, fewer delinquent behaviors, better frustration tolerance, and better psychosocial functioning. In particular, student perceptions of teachers being fair are independently associated with decreased rates of suicide attempts providing support for the importance of the teacher support in reducing risk (Fleming, Merry, Robinson, Denny, & Watson, 2007). To sum up, perceived support from teachers has been inversely associated with internalizing problems, both cross-sectionally and longitudinally. However, there is conflicting information on the effect of teacher support on changes in psychological adjustment over multiple time points. In one of the few studies focused on effects of teacher support on depressive symptoms over time, Rueger et al. (2014) found that support from teachers in 7th grade predicted fewer depressive symptoms in 7th grade, and predicted decreases in depressive symptoms from 7th to 9th grade. In contrast, another study of youth found that teacher support from 6th grade predicted depressive symptoms in 6th grade, but did not predict changes in depressive symptoms from 6th to 8th grade (Reddy et al., 2003). More work is needed to elucidate the impact that lack of teacher support can have in the lives of youth from childhood to late adolescence.

The review of the literature on Chinese youth yielded few studies that investigated the relationship between lack of teacher support and youth internalizing symptoms, but still, the significant role of high level teacher support in youth's psychological adjustment is well supported. In a sample of Gansu adolescents aged 13 to 16 years old, Davidson and Adams (2013) found that among youth who experienced cumulative adversities in rural villages, high level teacher support buffered the impact of family and academic risk factors on internalizing problems. Similarly, in a study of 221 urban adolescents, perceived social support from teachers was the strongest predictor of Chinese youth positive psychological functioning (Tian, Liu, Huang, & Huebner, 2013). In a comparison study on Chinese and American students, Jia et al. (2009) found that when compared to parental support, teacher support was a stronger predictor of psychological adjustment for both groups.

Overall, most Western studies indicate that although teacher support is more emotional for younger students (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008), the support becomes more instrumental and informational for adolescent students (Malecki & Demaray, 2003). In rural China where resource is constrained, teachers are expected to be mentors and caregivers to provide guidance on a range of issues from problems at home to conflicts with friends, thus transmitting knowledge and skills to students is only one of many diverse responsibilities. When youth entered into middle schools (which are typically out of town), most rural students live on campus to save time and money on the commute, and they usually go home once every week or less, their head teachers often are in charge of everything besides their academic life (Liu, Li, Chen, & Qu, 2015). Thus, there is a great possibility that rural youths perceive their teachers as

attachment figures and desire teacher support. Previous research supported that rural youth were more responsive to the positive effect of consistent teacher support, as well as the negative effect of low teacher support (Luo, Gao, & Zhang, 2011). Given teachers are highly valued in Chinese culture and the unique circumstances in rural areas, it is reasonable to assume that rural youths are especially susceptible to the influences of teachers, and perceived lack of teacher support is a critical risk factor for youth psychological development.

Perceived adverse classroom climate. School class is contended to be an important unit in studying the growth trajectory of Chinese children and adolescents. When a child enters school, she or he is assigned to a specific class, and that class becomes the immediate school environment. Because all courses are taught within the same classroom, the class provides the closest school experiences for the next several years (Yi et al., 2009). Classroom climate is a construct that had been useful in examining the quality of classroom interactions. It refers to "global classroom atmosphere and the degree to which the classroom as a whole function smoothly and harmoniously and is characterized by interactions with a positive tone or, conversely, by frequent disruption, conflict, and disorganization" (Gazelle, 2006, p.1180). Thus, an adverse classroom climate is characterized by high levels of conflict and disruptive behaviors.

Initial investigators focused on the relationship between classroom climate and academic and behavioral outcomes (e.g., Bradshaw, Sawyer, & O'Brennan, 2009; Buyse et al., 2008); however, classroom climate studies now also consider the relationship between classroom climate and psychological outcomes among youth. Adverse classroom climate is related to mental health problems such as depressive symptoms and suicidality

(Kuperminc et al., 2001; Smith & Brian, 2000; Way et al., 2007). In a study of 460 children and adolescents in 6th and 7th grade, Kuperminc and colleagues (2001) found the perceptions of the school classroom climate (i.e., fairness, order, discipline, sharing of resources, and student interpersonal relationships) accounted for 2% of the variance in anxious-depressed symptoms and 7% in behavioral problems at the 12-month follow-up. Declines in dimensions of positive school classroom climate, such as peer support, student autonomy, and clarity and consistency in school rules and regulations also were associated with declines in psychological adjustment measured by depression and self-esteem over time (Way et al., 2007). Research also suggested adverse classroom climate characterized by bullying and peer victimization was associated with low self-esteem, depression, and suicide (Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Smith & Brian, 2000).

In the Chinese context, there is limited research on the relationship between classroom climate and depressive symptoms in children and adolescents leading some researchers to suggest classroom climate is an underexplored parameter in the arena of adolescent mental health (Jia et al., 2009). However, the available research suggested a strong link between classroom climate and adolescent depression (Jia et al., 2009) and suicidal ideation and suicide attempts (Li, Bao, Li, & Wang, 2016). In a study that examined 706 children and adolescents from Nanjing, Jia and colleagues (2009) found that perceived positive school climate was negatively associated with depressive symptoms. In measuring classroom climate, Jia et al. (2009) explored two more dimensions besides teacher support, i.e., student-student support and opportunities for autonomy. When compared with support from teacher and parents, student-student support was found to be the strongest correlate of youth depressive symptoms (Jia et al.,

2009). Likewise, Li et al. (2016) found that perceived negative school climate played an important role in adolescent suicidality. In this study, adverse classroom climate was characterized by low level of student-student support, poor teaching and learning atmosphere, and high frequency of bullying (Li et al., 2016). Particularly, physical victimization is not uncommon for youth in the highly impoverished setting. For example, using Wave I and Wave II of GSCF, Adams and Hannum (2016) reported that 40% of students surveyed reported that they had been beaten by classmates.

Classroom climate is a complex, multifaceted concept and measures of climate used in past research frequently did not specify the type of climate that is important and unique to Chinese youth in the studied area. Building on previous research, and considering the uniqueness of classroom context in rural Gansu, this study improved by measuring classroom climate comprehensively, which included violating school discipline, cheating in homework and exams, disrupting the class, fighting with each other, and bullying (physical beating). Given ample research shows that disruptive and sometimes violent happenings at school experienced by the target child (see review by Hawker & Boulton, 2000) and students who behave well and are not the primary targets of the disruption and aggression (Adams & Hannum, 2016) can lead to internalizing problems, it is critical to examine the effect of adverse classroom climate on youth psychological functioning in rural China.

Summary

Together, the literature clearly supports the continued impact of gender, parental warmth, lack of teacher support, and adverse classroom climate on internalizing problems from childhood to late adolescence. However, a lack of research on the unique and

interactive effects of these factors, especially over multiple time points, limits interpretation and application of previous findings to intervention efforts among rural Chinese youth. Thus, the current investigation aims to add to the literature by using longitudinal data across eight years to examine the independent effect of gender and school experiences in predicting developmental patterns of internalizing symptoms through the transition to adolescence, and the moderating role of parental warmth in these effects. In addition, because perceptions of social support and adversity have been shown to more strongly influence mental health than the actual receipt of support and adversity (Turner & Turner, 1999), this current investigation focuses on the perceptions of parental warmth, lack of teacher support, and adverse classroom climate.

CHAPTER 3

METHODS

Study Design

This study employed a non-experimental and correlational research design. Secondary data analyses of the Gansu Survey of Children and Families (GSCF, 2010a) restricted-use data were conducted. The current study design was also longitudinal in nature because the data represented three time points from childhood to late adolescence. For this study, the GSCF data collected from Wave I (2000), Wave II (2004), and Wave III (2007) were employed.

Growth curve analysis is a statistical technique to obtain a description of the mean growth in a population over a specific period of time, it could also estimate individual differences in the initial level as well as in the growth rate (Raudenbush & Byrk, 2002). For this study, two-level growth curve models allow the examination of the mean trajectory of youth internalizing problems from childhood through late adolescence. This analytic approach also allows the examination of how individual risk and protective factors (i.e., gender, perceived parental warmth, perceived lack of teacher support, and perceived adverse classroom climate) relate to youth internalizing problems, both in late childhood and over time. Further, use of interactions within the multilevel growth models allows the investigation of parental warmth as a moderator of risk factors on changes in internalizing problems.

Overview of the GSCF Study

Study design. The GSCF is a longitudinal project tracking various dimensions of child welfare such as education, health, and psychosocial development as rural youth transit from childhood to early adulthood in Gansu, China (GSCF, 2010a). As the first large-scale multi-level youth survey undertaken in rural China, the GSCF collected data in 2000, 2004, 2007, and 2009. The baseline survey in 2000, included a primary representative sample of 2,000 children aged 9 to 13 in 100 villages. In the sampled 100 villages, an average village had 364 households (ranging from 65 to 974) and a population of about 1,580 (ranging from 267 to 4,038). Information was collected from six linkable samples of children, mothers, heads of household (typically fathers), home-room teachers, school principals, and village leaders.

Gansu is an interior province in Northwest China characterized by prevailing impoverishment and illiteracy (GSCF, 2010b), with 68% of the population residing in rural areas in 2007 (National Bureau of Statistics of China [NBSC], 2016). The per capita Gross Domestic Product (GDP) was $464 in Gansu and the per capita net income of rural residents in the province was $173 in 2007 (NBSC, 2016).

Sampling Strategy. A four-stage stratified systematic sampling strategy was used to recruit participants with the assistance of the Gansu Statistical Bureau (the process of sampling is illustrated in Figure 3.1) (GSCF, 2010c). Among the total of 86 counties in Gansu, a systematic sample of 20 counties was selected. At Stage 1, each county in Gansu, except the Zang counties (autonomous minority regions) due to travel restrictions, language barriers, limited transportation, and dispersed populations, was ranked according to per capita income in descending order. Every fourth county was selected into the

sample pool with a random start. At Stage 2, towns were selected from the sampled counties, and all townships were ranked in (alphabetic) geographic order in each sampled county. A systematic sample of 42 townships was selected from the list of townships in the sampled counties with a random start. The number of townships selected from each sampled county was determined based on the rural population in that county. At Stage 3, systematic sampling strategy with a random start was employed to recruit 100 sample villages from the sampled townships. The number of villages recruited from each town was determined based on the rural population in each selected town. At Stage 4, a random sample of 20 children from birth registries was selected from a listing of all 8-13 years old youth in the year 2000 in each selected village. Only willing participants were included. In the case where the family has more than one child who met the age criterion, only one was randomly chosen to participate.

Because minority autonomous (Zang) counties were excluded from the sampling frame, the sample does not contain sufficient numbers of minority youth for meaningful analysis (GSCF, 2010c). With this caveat, the GSCF is representative of children and adolescent in rural areas of Gansu and includes relatively wealthier and poorer rural villages.

Procedure. Graduates from a local university and staff from a local statistics bureau served as survey administrators or interviewers and collected data from the sampled children, families, schools and villages (GSCF, 2010d). Prior to data collection, these personnel received a week of intensive training in conducting interviews and administering the self-report instruments. The training also included explaining the research purpose and the process of obtaining consent from all participants. Particular

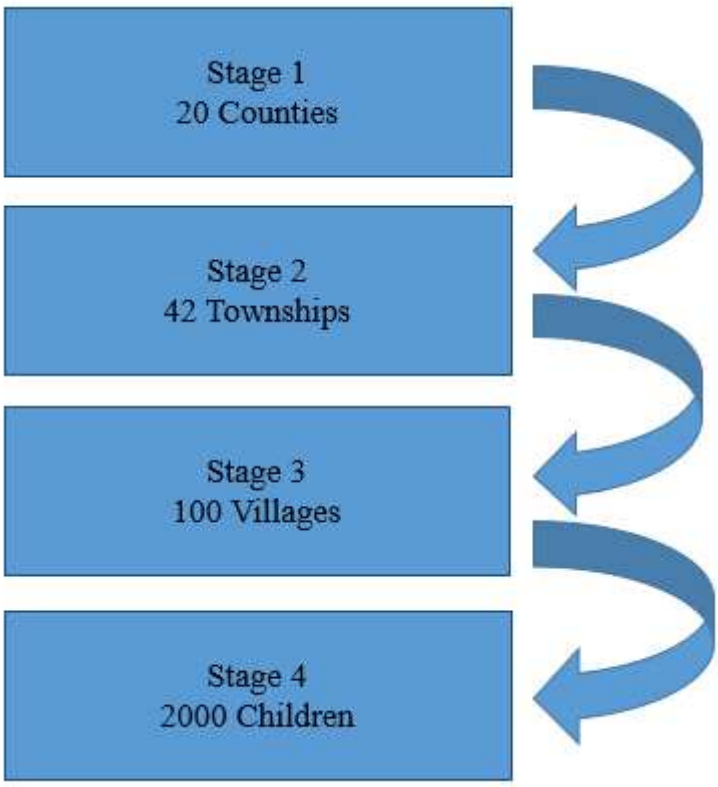


Figure 3.1 Multi-stage cluster sampling process of GSCF.

attention was given to understanding how to establish a professional rapport with the interviewees and how to handle possible questions that might arise during the administration of research instruments and interviews.

Within a one-week period, two home visits, with each lasting about two hours, were made to each family (GSCF, 2010d). Informed consent forms were completed during the first visit. The mother and/or father consented to her/his own and her/his child's participation in the survey. The mother or father also provided the name and location of the child's school and authorized the child's teacher to provide the interviewers with information concerning the child's performance at school. During the second visit,

questionnaires were completed by the mother (Mother Survey) and father (Household Survey), respectively.

In each visit, to accommodate the parents' limited literacy skills, the trained interviewer orally administered the Household Survey to the household head (usually the father, if not, the mother or grandparents when parents were not available) and the Mother Survey to the mother separately, and recorded his/her responses (GSCF, 2010d). Each interview was conducted privately between the interviewer and the household head or the mother depending on the nature of the survey, with the other family members not involved and stayed where they were not able to overhear the conversations. Except for some questions, such as background information and family income, the interviewee could consult other family members if needed. In addition, the child of the family was there to report his or her age and gender. In this study, information about parents' education and family wealth and the youths' age and gender was collected based on the Household Survey. To be detailed, the household heads were asked about the value of their house and the value of each of the other family assets such as television, radio, bicycle, and furniture etc. Mother Survey was administered to gather information on child rearing practices, parental attitude, and physical and psychological health of the child from each mother.

The Child Survey assessed the children's demographics, physical activities, study habits, time allocation, diet, eye-sight, self-rated academic performance, perceptions of parenting practice, perceptions of school experiences, and psychological functioning (GSCF, 2010d). The survey was administered in groups in the classroom, with each group consisting of 15 or fewer children, lasting about one and half hours. During the administration session, an interviewer read the items one by one, while the children

provided their responses independently. Two or three research assistants were in the classroom to provide help as needed. The process was identical for the data collection of the Child Survey across the first three waves. In Wave IV, youth completed the survey in his/her own house when they returned home from universities or work for Chinese New Year.

The Village Survey was distributed to the village leader or the secretary of village committee by a trained interviewer to gather information about the community environment (GSCF, 2010d). Informed consent was obtained at the site. During the administration session, an interviewer gave standard instructions and then left the village leader the survey to complete. The interviewer was at the site to answer possible questions or make clarifications. The Home-room Teacher Survey and School Principal Survey were administered in the similar ways as described above for the village leader. These two surveys gathered information about the sample child's educational outcomes and village schools, respectively.

Given the research purposes of this study, the responses provided by each participating child on the Child Survey (including perceptions on parental warmth, lack of teacher support, adverse classroom climate, and scores on internalizing problems scales), the responses provided by each household head on the Household Survey (including child age and gender, father education, family structure, and family SES), and scores from academic tests (including language and math) were analyzed in the current study.

Study Sample

Data in the current study come from the first three waves of the GSCF, and cover approximately eight years between Wave I (2000) and Wave III (2007). This provides

data on experiences ranging from childhood (8-13 years old) into late adolescence and early adulthood (15-20 years old). We did not utilize Wave IV data because most of the respondents were adults in Wave IV. Likewise, respondents who were over 18 years old in Wave III were not included in the study sample. We employed this inclusion criterion because the tools used to measure internalizing problems were developed for use with children and adolescents. We also restricted the sample to include respondents who participated in the study at a minimum in Wave I and Wave III and who remained enrolled in school during the developmental period examined. Of the original 2,000 children included in Wave I, 1,173 youth met our study inclusion criteria.

Missing data. Of the 1,173 youth who met inclusion criteria, 994 (84.74%) had no missing data on substantive variables of interest related to the study across the three waves. Because analytic sample size and the generalizability of findings can be limited by employing sample inclusion criteria, missing data were discerned to determine the frequency of missing data across observations in three waves and to what extent the missingness was random. On average, children were missing 0.66 items (*sd*=2.15, ranging from 0 to 13 items; Appendix A, Table A.1). In Wave I, no data were missing on the level-1 predictor variable (i.e., youth age), only one child had missing data on the summative scores of parental warmth, lack of teacher support, and internalizing problems scales, and two children had missing on all of the items used for adverse classroom climate measurement in the original sample who met inclusion criteria. In Wave III, 86 were missing on youth age, and no data were missing on the level-2 predictor variables (i.e., parental warmth, lack of teacher support, and adverse classroom climate) and the outcome variable (i.e., internalizing problems).

Most of the correlation between missingness on pairs of variables (i.e., phi coefficients) were within an acceptable range of -.01 to .26; however, a few stronger correlations were observed (Appendix A, Figure A-1). To be detailed, missingness on youth age in 2004 and family SES, parental warmth, lack of teacher support, and adverse classroom climate variables in 2004 were the strongest correlation ($\varphi = .99$), followed by missingness on age in 2004 and academic performance in 2004 ($\varphi = .96$), missingness on age in 2004 and father education ($\varphi = .91$), and missingness on academic performance in 2000 and adverse classroom climate in 2000 ($\varphi = .71$). Summing up, a majority of strong associations between missingness on two variables appeared to be among Level-1 and Level-2 variables in 2004, because 7.08% of respondents did not provide observations in Wave II. This group of youth who chose to participate only in Wave I and Wave III might be systematically different from youth who participated in all three waves.

Because the missingness on the variables mentioned above appeared to be systematic, caution should be exercised in interpreting the parameter estimates of these variables. To be detailed, because the variables used to measure parental warmth, lack of teacher support, and adverse classroom climate in 2004 did not appear to be missing at random, the obtained parameter estimates for these variables, as well as the parameter estimates for variables correlated with these variables have been interpreted with additional caution as they are likely to be biased. In addition, no strong correlations were found between missingness and observed values in most cases: the majority of correlation coefficients ranged from -.18 to .27. Only one correlation coefficient between missingness and observed values is -.68, that is missingness on father education and observed value on family structure in 2004 (Appendix A, Figure A-2).

Approximately 92.92% of respondents provided three observations, and 7.08% of respondents provided two observations. Missing data among all children and all variables across the three waves was 2.55%. When the sample size is large and missing data are less than 10%, listwise deletion does not cause any more bias than imputation (Roth, 1994). Therefore, we chose to listwise delete youth with missing data. As a result, the final analytic sample is 994 respondents.

Measures

Time-varying dependent variable. ***Youth internalizing problems.*** The outcome variable was measured by a summative scale adapted from the Child Behavior Checklist (CBCL) and Youth-Self Report (YSR) (Achenbach, 1991). Because the CBCL and YSR were developed from a Western perspective, the items might not be culturally relevant in measuring psychological functioning of youth in rural China. To address this issue, three rounds of pilot testing the scale items were completed with children from three counties of the province to ensure cultural appropriateness. Item analysis was then conducted on the pilot data, and items revealing low internal consistency or deemed inappropriate for rural Chinese youth were subsequently deleted. Additionally, focus groups with teachers were also conducted to review the items written in Chinese and suggest wording adjustment or deletion of items perceived as irrelevant to the target population (Liu, 2003).

To confirm the Internalizing Problems Scale as one dimension in the current analysis, Exploratory Factor Analysis (EFA) with varimax rotation using SAS v9.4 (SAS Institute Inc., 2013) was employed to explore how the scale items held together. Criteria for determining the number of factors included a) eigenvalues greater than 1, b) factors had to have at least 3 items with factor loadings of .40 or greater, and c) the overall

interpretability of the factors (Santos, Lippke, & Pope, 1998). Following these criteria, a single factor that comprised of 15 of the original 19 items were retained. The proportion of variance accounted for by the factor was 99.7% and the 15 items that loaded onto the single factor all had factor loadings of .40 or greater. Details on which items loaded onto the factor can be found in **Error! Reference source not found.**.

Each item in the Internalizing Problems Scale was rated on a 4-point Likert scale, from *strongly disagree* (1) to *strongly agree* (4). The scale exhibits good internal consistency at Wave I (Cronbach's alpha=.82), Wave II (Cronbach's alpha=.77), and Wave III (Cronbach's alpha=.83). It includes items, such as "I cannot concentrate on what I am doing", "sometimes my mood changes suddenly", and "my future life will not be happy." (See Appendix B for a complete list). The summative score of this scale indicates the extent of internalizing problems, with higher scores suggesting that the child is experiencing more internalizing symptoms.

We used a self-reported outcome variable for internalizing problems in the current study, because meta-analysis has revealed that informant-reported (e.g., parent or teacher) measures of internalizing problems correlate only modestly with self-reports, and cannot fully substitute for the youths' own perspectives (van Dulmen & Egeland, 2011).

Level-1 time-variant predictor. ***Age*** is used as the index of time rather than the more typically employed wave of data collection, given that the research design of GSCF is a cohort-sequential design in which there is variability in age at each wave of data collection. The use of age as the metric for time increases the precision with which each child's growth trajectory can be measured (Singer & Willett, 2003). Youth's age was

grand-mean centered, i.e., the mean age across all youth, across all time points of measurement.

Table 3.1 *Factor Loadings for Exploratory Factor Analysis with Varimax Orthogonal Rotation of Internalizing Problems Items (n=1,173)*

Factor reliability items	Item label	Factor1
My classmates often make fun of me.	Cg2r	.57*
I can't do anything well unless adults are there.	Cg2h	.57*
I am often suspicious of others.	Cg3h	.57*
I prefer to be alone.	Cg3k	.56*
I can't concentrate on what I am doing.	Cg2e	.53*
I often feel nervous.	Cg3n	.50*
Sometimes my mood changes suddenly. I might be happy one moment and then I don't know why for some reason I suddenly can no longer feel happy.	Cg3c	.48*
I am often tired.	Cg3o	.47*
I always want to attract others attention.	Cg2m	.47*
There is always something to worry about.	Cg3t	.46*
I feel inferior to others.	Cg3e	.45*
I don't like to let others know about my affairs.	Cg2c	.43*
I do not feel sad, even if I have done something that I shouldn't have.	Cg2s	.42*
My future life won't be happy.	Cg1i	.41*
I blush easily.	Cg2g	.40*
I often don't talk when I am with my classmates, most of the time I listen to them talking.	Cg3p	.31
I am very shy.	Cg2k	.06
I often have many different kinds of ideas in my mind.	Cg2f	.06
I am very indifferent to others.	Cg2j	.04

*Note.*Values greater than 0.4 are flagged by an '*';
Initial Factor Method: Maximum Likelihood;
Proc Factor using the Method=ML, Priors=SMC, Scree, Reorder, Rotate=Varimax, and Flag=.40.

Table 3.2 *Factor Loadings for Exploratory Factor Analysis with Varimax Orthogonal Rotation of Positive Parenting Practices Related Items (n=1,173)*

Factor reliability items	Item label	Factor1
If you have done something wrong, your parents will point it out.	Ch1f	.50*
When your school performance is poor, your parents encourage you to study harder.	Ch1m	.47*
Your parents often ask about school.	Ch1w	.46*
Your parents encourage you to think independently.	Ch1j	.45*
Your parents like to talk to you.	Ch1o	.45*
If you have done something wrong, your parents will ask you to explain the reason and then discuss with you the correct way to do it.	Ch1e	.45*
Your parents often ask about your homework.	Ch1v	.44*
When your parents ask you to do something, they tell you why.	Ch1k	.42*
Whatever problem you may have you are always willing to tell your parents about it.	Ch1r	.39
If you do not argue with your parent's opinions, they are willing to allow you to speak out your own idea.	Ch1t	.39
Your parents always talk with you good naturedly and gently.	Ch1i	.38
Your parents encourage you to work hard at everything.	Ch1h	.37
When you feel unhappy, your parents easily notice.	Ch1p	.36
Your parents talk to you about things that interest you.	Ch6k	.27
Your parents show affection by hugging you or patting you.	Ch6g	.25
Your parents praise you or say "thank you".	Ch6f	.24

Note. Values greater than 0.4 are flagged by an '*';
Initial Factor Method: Maximum Likelihood;
Proc Factor using the Method=ML, Priors=SMC, Scree, Reorder, Rotate=Varimax, and Flag=.40.

Level-2 time-invariant predictor. ***Child biological sex*** was represented by a dummy variable with a value of 1 being male (*girl=0, boy=1*).

Level-2 time-variant predictors. ***Perceived parental warmth*** was measured by a summative scale of youth-report supportive parenting adapted from the Child Reports of Parenting Behavior Inventory (Schaefer, 1965). To capture the perspectives of the

children, the data for parental warmth was gathered from the Child Survey. Similarly, based on the results of the pilot tests of the scale items with the Chinese children and on the focus group consultations with their teachers, as well as reflecting the Chinese culture and local rural contexts in which the target population was socialized, some items were adjusted or deleted from Schaefer's inventory.

To examine how the items on positive parenting behaviors hung together in the current study, EFA with varimax rotation using SAS v9.4 was employed. To reiterate, criteria for determining the number of factors included a) eigenvalues greater than 1, b) factors had to have at least 3 items with factor loadings of .40 or greater, and c) the overall interpretability of the factors. Following these criteria, a single factor comprised of 8 of the original 16 items was retained. The proportion of variance accounted for by the factor was 100% and the 8 items that loaded onto the single factor all had factor loadings of .40 or greater. Details on which items loaded onto the factor can be found in Table 3.2.

Subsequently, eight items were retained for the Perceived Parental Warmth Scale. Each item was rated on a 3-point Likert scale, from *never* (1) to *often* (3). The scale exhibits moderate level of internal consistency at Wave I (Cronbach's alpha=.68), Wave II (Cronbach's alpha=.78), and Wave III (Cronbach's alpha=.77). It includes items, such as "if you have done something wrong, your parents will point it out", "when your school performance is poor, your parents encourage you to study harder", and "your parents like to talk to you" (See Appendix B for a complete list). The summative score of this scale indicates the frequency with which youth perceiving parents employing supportive parenting behaviors, with higher scores suggesting that the child perceives experiencing higher frequency of parental warmth.

Perceived lack of teacher support was measured by a reverse-coded summative scale of youth-report teacher support adapted from the Child and Adolescent Social Support Scale (Malecki & Demaray, 2002). To capture the perspective of the children, the data for lack of teacher support were gathered from the Child Survey. To make full use of the rich information of youth-report teacher support at school, EFA was conducted as well. Following the same criteria of factor retention discussed above, a single factor comprised of 5 of the original 8 items was retained. The proportion of variance accounted for by the factor was 100% and the 5 items that loaded onto the single factor all had factor loadings of .40 or greater. Details on which items loaded onto the factor can be found in Table 3.3.

Subsequently, five items were retained for the Lack of Teacher Support Scale. Each item was rated on a 4-point Likert scale, from *strongly agree* (1) to *strongly disagree* (4). The scale exhibits acceptable level of internal consistency at Wave I (Cronbach's alpha=.60), Wave II (Cronbach's alpha=.63), and Wave III (Cronbach's alpha=.66). It includes items, such as "teachers at our school treat students very fairly", "teachers at our school care a lot about the students", and "teachers like me" (See Appendix B for a complete list). The summative score of this scale indicates the extent of lack of teacher support, with higher scores suggesting that the child perceives more lack of teacher support experiences.

Perceived adverse classroom climate was measured by a summative scale of youth-report adverse classroom climate. To capture the perspective of the children, the data for adverse classroom climate were also gathered from the Child Survey. Similarly,

following the same criteria of factor retention, a single factor comprised of 6 of the original 9 items was retained. The proportion of variance accounted for by the factor was

Table 3.3 *Factor Loadings for Exploratory Factor Analysis with Varimax Orthogonal Rotation of Lack of Teacher Support Related Items (Reverse Coded) (n=1,173)*

Factor reliability items	Item label	Factor1
Teachers at our school care a lot about the students.	Ce2e1	.54*
Teachers at our school treat students very fairly.	Ce2f1	.51*
Teachers encourages us to ask questions.	Ce2m1	.46*
Teachers like me.	Ce2u1	.45*
The teaching quality at my school is very good.	Ce2d1	.41*
If I study hard, the teacher will praise me.	Ce2a1	.39
Most teachers like to listen to me talk.	Ce2c1	.34
The teacher often pays attention to me in class.	Ce2b1	.23

Note. Values greater than 0.4 are flagged by an '*';
Initial Factor Method: Maximum Likelihood;
Proc Factor using the Method=ML, Priors=SMC, Scree, Reorder, Rotate=Varimax, and Flag=.40.

Table 3.4 *Factor Loadings for Exploratory Factor Analysis with Varimax Orthogonal Rotation of Adverse Classroom Climate Related Items (n=1,173)*

Factor reliability items	Item label	Factor1
Students copy others' homework.	Cf5f	.65*
During tests, students cheat by referring to their books or copying from others' answers.	Cf5e	.56*
There are fights between students.	Cf5h	.55*
Some students disrupt the class.	Cf5g	.49*
Some students bully other students.	Cf5i	.46*
Students violate school discipline.	Cf5d	.42*
The teacher is absent from class.	Cf5a	.33
School shuts down.	Cf5b	.26
Students complain to the teacher.	Cf5c	.19

Note. Values greater than 0.4 are flagged by an '*';
Initial Factor Method: Maximum Likelihood;
Proc Factor using the Method=ML, Priors=SMC, Scree, Reorder, Rotate=Varimax, and Flag=.40.

100% and the 6 items that loaded onto the single factor all had factor loadings of .40 or greater. Details on which items loaded onto the factor can be found in Table 3.4.

Subsequently, six items were retained for the Adverse Classroom Climate Scale. Each item was rated on a 3-point Likert scale, from *never* (1) to *often* (3). The scale exhibits acceptable level of internal consistency at Wave I (Cronbach's alpha=.69), Wave II (Cronbach's alpha=.79), and Wave III (Cronbach's alpha=.78). It includes items, such as "some students bully other students", "some students disrupt the class", and "during tests, students cheat by referring to their books or copying from others' answers" (See Appendix B for a complete list). The summative score of this scale indicates how often the disruptive and aggressive peer behavior occurred in the classroom, with higher scores suggesting that the child is experiencing more adverse classroom climate.

Level-2 control variables. Family structure and family SES at each wave were controlled. Family structure was represented by a dummy variable with a value of 1 being from non-single parent families, a value of 0 being from single parent families. Family SES was included as a composite variable taking into account the total values of wages, personal business income, agricultural production, household property, and all durable goods and equipment owned by the family, because the concept of wealth is not accurately captured by income alone in rural China, where many households are involved in home-based agricultural production and small business (Rozelle, Taylor, & deBrauw, 1999). The family heads were also asked about the value of their house and the values of each of the other family assets such as television, radio, bicycle, furniture, etc. A sum of these values in Renminbi (RMB) was used in the family SES composite. In China's highly exam-based, competitive school system, poor academic performance might lead to youth

internalizing problems (Yi et al., 2009), thus academic performance represented by total scores of language and math tests at each wave were included and controlled. Father's education was controlled as years of schooling completed by the child's father. All continuous predictor variables without a meaningful interpretation of zero were grand-mean centered.

Data Preparation

Prior to conducting any analysis, several data management tasks were completed. To improve data analysis processing time, a smaller dataset that contained only methodological variables (i.e., child respondent identification) and substantive variables of interests (i.e., predictor, outcome, and control variables) in wide format was created. To analyze the data using growth curve modeling, the wide format (multivariate data) was transformed into the long format (univariate data) in which each row presents a specific time point rather than a participant. All data management tasks were executed in SAS v9.4 (SAS Institute Inc., 2013).

Analytic Approach

Two-level growth models. To examine the trajectory of internalizing problems from childhood to late adolescence, the two-level growth curve models were employed. This approach extends multiple regression to account for dependencies in the data (i.e., time nested in individuals in this study). Another advantage of multilevel modeling is that it provides for the use of unbalanced data, missing data, data that are collected at uneven time intervals, and individuals can differ in age at the first point of data collection (Raudenbush & Byrk, 2002). This approach allows me to use youth age as the index of time, despite age differences at each time of measurement, and in doing so, I am able to

detect developmental patterns of interest that might have been obscured by the wave of assessment.

Univariate and bivariate analyses. Descriptive and bivariate statistics on all variables were run. Descriptive statistics of all variables were presented to show the overall trends of the repeated measure variables in Table 4.1. Bivariate analyses included correlational analyses to better understand how the variables of interest were interrelated at each wave as shown in Table 4.2 to Table 4.4, respectively.

Assumption check. Before conducting any multivariate analyses, data were screened for violations of assumptions often associated with multilevel models (i.e., multicollinearity, normality, linearity, and homogeneity of variance). The data screening techniques (i.e., MIXED_DX) were the same as those recommended by Bell et al. (2010). In order to test the assumptions, the data were firstly analyzed for multicollinearity through examination of tolerance values. Tolerance values can range from 0 to 1 with values near 1 indicating the low levels of collinearity and high levels of independence. Tolerance values near zero indicate that a variable has little unique contribution to the models. The acceptable tolerance values of all variables in the two levels in this study (i.e., ranging from .84 to .99) indicated that a low degree of collinearity, each variable made a unique contribution to the models, and there was no evidence of multicollinearity when predicting internalizing problems (see Appendix C, Table C.1). Next, Level-1 and Level-2 residuals were examined for potential violations of normality, linearity, and homogeneity of variance. For residuals at both levels, box-and-whisker plots and histograms of residuals were analyzed. Examination of the box-and-whisker plots and histograms (see Appendix C: Figure C.1 and Figure C.2) did not suggest serious violations of normality

assumptions. Finally, normality, linearity, and heteroscedasticity were also examined by plotting the Level-2 residuals against the predicted values for internalizing symptoms (see Appendix C: Figure C.3 and Figure C.4). The resulting scatter plots showed no evidence of heteroscedasticity. In addition, Figure C.5 in Appendix C contains a histogram displaying the distribution of Mahalanobis distance values for each Level-2 unit which allowed us to examine the range of values to determine if potentially problematic outliers were evident. No problematic outlier was found in this study. The numerical output generated by MIXED_DX (see Appendix C: Figure C.6 to Figure C.9) supplement the visual evaluation of assumption check and potential problematic outliers.

Multivariate analyses. Two-level growth curve models were examined to investigate the extent to which gender, parenting practices, and school experiences were associated with trajectories of internalizing problems from childhood to late adolescence using maximum likelihood estimation and between within degrees of freedom. All continuous predictor variables without a meaningful interpretation of zero were grand-mean centered. Grand-mean centering was used instead of group-mean centering because the focus of the study was the interactions between Level-2 predictors (Enders & Tofighi, 2007). Overall, nine growth models were estimated to examine the aforementioned relationships. A description of the models that were examined in this study is presented below. See Table 3.5 for a general overview of the structure of each growth model for the criterion variable.

Model Building. The two-level growth random effect models were examined in order of complexity, starting with the simplest model that had no predictor and ending with the most complex model with three-way cross-level interaction terms. All

Table 3.5 *Summary of Model Structure for the Two-Level Growth Curve Model*

Model	Internalizing Problems at Wave I – Wave III Predictor Variables
Model 1: Unconditional Model	None
Model 2: Level-1 Time-Level Model	Age
Model 3: Level-2 Individual-Level Model (main effect)	Model 2 +gender, parental warmth, lack of teacher support, adverse classroom climate, academic performance, father's education, family structure, family SES
Model 4a: Two-way Cross-Level Interaction Model	Model 3 + age*gender
Model 4b: Two-Way Cross-Level Interaction Model	Model 3 + age*lack of teacher support
Model 4c: Two-Way Cross-Level Interaction Model	Model 3 + age*adverse classroom climate
Model 5a: Three-Way Cross-Level Interaction Model	Model 4b + age*gender, parental warmth*gender, age*gender* parental warmth
Model 5b: Three-Way Cross-Level Interaction Model	Model 4c + age*parental warmth, parental warmth*lack of teacher support, and age*lack of teacher support*parental warmth
Model 5c: Three-Way Cross-Level Interaction Model	Model 4d + age*parental warmth, parental warmth*adverse classroom climate, and age*adverse classroom climate*parental warmth

multivariate data analyses were conducted using PROC MIXED in SAS v9.4 (SAS Institute Inc., 2013) with maximum likelihood (ML) estimation and between within degrees of freedom.

First, we estimated a fully unconditional means model with no predictors (Model 1) to examine the significance of between-individual and within-individual variance of internalizing problems. Model 1 is

$$Y_{ti} = \beta_{00} + \mu_{0i} + e_{ti} \quad (1)$$

where Y_{ti} symbolizes the psychological outcome for student i at time t. The time variable was centered at 13.99 years old, so that the overall intercept, β_{00}, represents the youth' s level of internalizing problems at 13.99 years old. The Level-2 residual, μ_{0i}, represents the deviation of student's intercept from the overall intercept, i.e., between-individual variability in the intercept. The Level-1 residual, e_{ti}, represents the random, within-individual differences between the predicted and observed values of internalizing symptoms.

Next, a Level-1 model (Model 2) examined the change rate of youth internalizing problems. The Model 2 consists of only the time variable (i.e., age) and represents an empty growth model. Model 2 is

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (2)$$

where Y_{ti} symbolizes the psychological adjustment as the outcome measure for student i at time t, and it equals the value of β_{00} when at the centered age. β_{10} is the overall mean growth rate of outcome score between each year within individual. Age_{ti} represents the age point of measurement for individual i. The Level-2 residuals, μ_{0i} and μ_{1i}, represent the deviation of student 's intercept and slope from the overall intercept and slope, i.e.,

between-individual variability in the intercept and the slope. The term e_{ti} refers to normally distributed deviations from expected values for individual i at time t.

Then, the main effect model (Model 3) was expanded to include four individual-level (Level-2) predictors (i.e., gender, perceived parental warmth, perceived lack of teacher support, and perceived adverse classroom climate) and four individual-level control variables (i.e., youth academic performance, father's education, family structure, and family SES) to explain variance in the mean outcome scores. Model 3 is the main effect model with all variables in each level. The model is

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \beta_{01}(Gender)_i + \beta_{02}(Pwarm)_i + \beta_{03}(LTS)_i + \beta_{04}(ACC)_i + \beta_{05}(Acap)_i + \beta_{06}(Fedu)_i + \beta_{07}(Fstruc)_i + \beta_{08}(Fses)_i + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (3)$$

where everything represents the same meaning as discussed above, the new variable β_{01} - β_{08}, represents the fixed effect for each corresponding Level-2 predictor and control variable. To be detailed, β_{01}, β_{02}, β_{03} and β_{04} represents the effect of youth gender, perceived parental warmth, perceived lack of teacher support, and perceived adverse classroom climate, respectively. Similarly, β_{05}, β_{06}, β_{07} and β_{08} represents the effect of youth academic performance, father's education, family structure, and family SES, respectively.

In Models 4a – 4c, each of the two-way cross-level interaction terms, age*gender, age* perceived lack of teacher support, and age* perceived adverse classroom climate was added to each model separately. The two-way cross-level interaction models are

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \beta_{01}(Gender)_i + \beta_{02}(Pwarm)_i + \beta_{03}(LTS)_i + \beta_{04}(ACC)_i + \beta_{05}(Acap)_i + \beta_{06}(Fedu)_i + \beta_{07}(Fstruc)_i + \beta_{08}(Fses)_i + \beta_{11}(Age)(Gender)_i + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (4a)$$

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \beta_{01}(Gender)_i + \beta_{02}(Pwarm)_i + \beta_{03}(LTS)_i + \beta_{04}(ACC)_i + \beta_{05}(Acap)_i + \beta_{06}(Fedu)_i + \beta_{07}(Fstruc)_i + \beta_{08}(Fses)_i + \beta_{13}(Age)(LTS)_i + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (4b)$$

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \beta_{01}(Gender)_i + \beta_{02}(Pwarm)_i + \beta_{03}(LTS)_i + \beta_{04}(ACC)_i + \beta_{05}(Acap)_i + \beta_{06}(Fedu)_i + \beta_{07}(Fstruc)_i + \beta_{08}(Fses)_i + \beta_{14}(Age)(ACC)_i + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (4c)$$

where everything represents the same values as discussed above, the interactions β_{11}- β_{14} represent the effects of gender, perceived lack of teacher support, and perceived adverse classroom climate on the trajectory of internalizing problems, respectively.

In Models 5a – 5c, each of the three-way cross-level interaction terms, age*gender* parental warmth, age*lack of teacher support* parental warmth, and age*adverse classroom climate*parental warmth was added to each model separately. The three-way cross-level interaction models are

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \beta_{01}(Gender)_i + \beta_{02}(Pwarm)_i + \beta_{03}(LTS)_i + \beta_{04}(ACC)_i + \beta_{05}(Acap)_i + \beta_{06}(Fedu)_i + \beta_{07}(Fstruc)_i + \beta_{08}(Fses)_i + \beta_{11}(Age)(Gender)_i + \beta_{12}(Age)(Pwarm)_i + \beta_{gender*pwarm}(Gender)(Pwarm)_i + \beta_{age*gender*pwarm}(Age)(Gender)(Pwarm)_i + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (5a)$$

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \beta_{01}(Gender)_i + \beta_{02}(Pwarm)_i + \beta_{03}(LTS)_i + \beta_{04}(ACC)_i + \beta_{05}(Acap)_i + \beta_{06}(Fedu)_i + \beta_{07}(Fstruc)_i + \beta_{08}(Fses)_i + \beta_{12}(Age)(Pwarm)_i + \beta_{13}(Age)(LTS)_i + \beta_{lts*pwarm}(LTS)(Pwarm)_i + \beta_{age*lts*pwarm}(Age)(LTS)(Pwarm)_i + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (5b)$$

$$Y_{ti} = \beta_{00} + \beta_{10}(Age)_{ti} + \beta_{01}(Gender)_i + \beta_{02}(Pwarm)_i + \beta_{03}(LTS)_i + \beta_{04}(ACC)_i + \beta_{05}(Acap)_i + \beta_{06}(Fedu)_i + \beta_{07}(Fstruc)_i + \beta_{08}(Fses)_i + \beta_{12}(Age)(Pwarm)_i +$$

$$\beta_{14}(Age)(ACC)_i + \beta_{acc*pwarm}(ACC)(Pwarm)_i + \beta_{age*acc*pwarm}(Age)(ACC)(Pwarm)_i + \mu_{1i}(Age)_{ti} + \mu_{0i} + e_{ti} \quad (5c)$$

where everything represents the same values as discussed above, $\beta_{age*gender*pwarm}$ represents the moderating effect of parental warmth on gender on the trajectory (i.e., the relationship between gender and the trajectory of internalizing problems scores may differ depending on the level of parental warmth); $\beta_{age*lts*pwarm}$ represents the moderating effect of parental warmth on lack of teacher support on the trajectory (i.e., the relationship between lack of teacher support and the trajectory of internalizing problems scores may differ depending on the level of parental warmth); $\beta_{age*acc*pwarm}$ represents the moderating effect of parental warmth on adverse classroom climate on the trajectory (i.e., the relationship between adverse classroom climate and the trajectory of internalizing problems scores may differ depending on the level of parental warmth).

Model Interpretation. To determine what proportion of youth internalizing problems variance lies between individuals, the intra-class correlation coefficient (ICC) values was calculated based on the results from the unconditional model by the following equation:

$$ICC = \frac{\tau_{00}}{\tau_{00} + \sigma^2}$$

Model fit was examined by changes in Akaike information criterion (AIC) and Bayesian information criterion (BIC) combined as recommended by O'Connell and McCoach (2008). The pseudo-R^2 tests were not relied upon to evaluate the goodness of fit of multilevel models, because the models in the current analysis are random intercept and random slope. BIC has an advantage over chi-square difference tests in that it can be used

to compare models that differ either in the fixed part or in the random part. In addition, given BIC makes a stronger penalty for more complex models, AIC was employed to estimate models with three-way interactions. The models with smaller BIC or AIC will be considered as better fitting models.

CHAPTER 4

RESULTS

The results section is divided into three parts. First, descriptive statistics are presented to show the overall trends of the repeated measured variables. Second, correlation coefficients for the bivariate relationships between the substantive variables included in the model are presented to show associations at each time point. Third, results from Level-1, Level-2, and interaction growth models are illustrated in sequence. Research question 1 (internalizing problems among rural Chinese youth in childhood and over time) was answered from the results from the unconditional model (Model 1) and Level-1 model (Model 2). Research question 2 (impact of gender, lack of teacher support, and adverse classroom climate on internalizing problems in childhood and impact on changes in internalizing problems) was answered from results from the Level-2 model main effect model (Model 3) and the Level-2 interaction models (Models 4a-4c). Research questions 3 and 4 (the moderating role of parental warmth on the effect of gender, lack of teacher support, and adverse classroom climate on internalizing problems in childhood and over time) were answered from results obtained in Models 5a-5c.

Study Sample

The sampling frame for the current study consisted of youth who participated in the GSCF research project at least on Wave I and Wave III, who stayed in school, who had data on all methodological and substantive variables of interest related to the study,

and who were younger than 18 years old (n=1,173). After deleting cases with missing data, 994 youth were included in the analytic sample. As shown in Table 4.1, there were no substantial characteristic differences of youth in the study sample and the analytic sample.

Table 4.1 *Individual Characteristics for Study Sample (n=1,173) and Analytic Sample (n=994)*

	Study Sample (n=1,173)		Analytic sample (n=994)	
	%(n)		%(n)	
Biological Gender				
Female	45.61 (535)		44.87(446)	
Male	54.39(638)		55.13(548)	
Family Structure				
Single(Wave I)	4.18(49)		2.62(26)	
Two(Wave I)	95.82(1,124)		97.38(968)	
Single(Wave II)	1.69(18)		.07(7)	
Two(Wave II)	98.31(1,048)		99.30(987)	
Single(Wave III)	1.19(14)		1.11(11)	
Two(Wave III)	98.81(1,159)		98.89(983)	
	M(SD)	Min, Max	M(SD)	Min, Max
Age				
Wave I	10.41(.79)	8,13	10.31(.73)	8,13
Wave II	14.40(.78)	12,17	14.36(.75)	12,17
Wave III	17.34(.72)	15,18	17.31(.72)	15,18
Academic Performance				
Wave I	25.79(14.63)	0,70.50	25.85(14.43)	0,65.50
Wave II	18.96(9.51)	0,45.00	18.74(9.40)	0,45.00
Wave III	27.00(8.72)	0,49.75	27.00(8.57)	1,49.75
Father's Education (in years)	7.09(3.39)	0,20.00	7.14(3.39)	0,20.00
Family SES(in RMB)				
Wave I	25,249(29,125)	1,390, 623,160	26,282(30,332)	1,390, 623,160
Wave II	30,280(42,775)	1,015, 793,050	30,551(41,303)	1,015, 793,050
Wave III	35,773(34,834)	200, 375,958	36,477(36,628)	200, 375,958
Parental Warmth				
Wave I	18.10(2.92)	8,24	18.08(2.95)	8,24
Wave II	19.51(3.11)	8,24	19.52(3.12)	8,24

	Study Sample (n=1,173)		Analytic sample (n=994)	
Wave III	19.67(3.12)	8,24	19.69(3.15)	8,24
Lack of teacher support				
Wave I	8.77(2.35)	5,18	8.71(2.36)	5,18
Wave II	9.48(2.37)	5,20	9.44(2.38)	5,20
Wave III	8.63(2.23)	5,19	8.69(2.21)	5,19
Adverse classroom climate				
Wave I	11.25(2.50)	6,18	11.23(2.50)	6,18
Wave II	11.71(2.54)	6,18	11.69(2.50)	6,18
Wave III	10.84(2.48)	6,18	10.88(2.49)	6,18
Internalizing Problems				
Wave I	33.90(7.23)	15,60	33.93(7.32)	16,60
Wave II	29.92(5.60)	15,52	29.87(5.63)	15,52
Wave III	29.71(6.40)	15,59	29.69(6.36)	15,59

Descriptive Statistics

Means and standard deviations of all variables in the analytic sample are presented in Table 4.1. As shown, overall, there were slightly more boys than girls (55% vs. 45%) and the mean age was 10.31 years (*sd*=.73) on Wave I, 14.36 years (*sd*=.75) on Wave II, and 17.31 years (*sd*=.72) on Wave III. Youth included in the study sample primarily lived in two-parent households, approximately 97%, 99%, and 99% on each wave, respectively. On average, fathers of the study sample had about 7 years of schooling. Across waves, family SES was 26,282 RMB in 2000, 30,551 RMB in 2004, and 36,477 RMB in 2007. Regarding youth academic performance, average scores of language and math in total were approximately 26, 19, and 27 at Wave I, II, and III, respectively; and these scores were on the low end of the range.

Bivariate Analyses

Pearson's correlations between the main study constructs for each time point are presented in Table 4.2 to Table 4.4. The correlation statistics provide evidence for statistically significant negative relationships between internalizing problems and parental warmth, and statistically significant positive relationships between internalizing problems and measures of school experiences. Across waves, internalizing problems were significantly correlated with age (*rs*= -.04 to .04), parental warmth (*rs*= -.20 to -.08), lack of teacher support (*rs*= .12 to .30), and adverse classroom climate (*rs*= .10 to .25). However, internalizing problems was significantly associated with youth gender (*r*=-.03) only at Wave III.

Table 4.2 *Intercorrelations of Variables of Interest at Wave I (n=994)*

Variable	1	2	3	4	5	6
1. Child age	-					
2. Child gender	-.04	-				
3. Parental warmth	.13*	.07*	-			
4. Lack of teacher support	-.02	.05	-.19*	-		
5. Adverse classroom climate	.07*	.01	-.01	.11*	-	
6. Internalizing problems	-.04*	.05	-.08*	.12*	.10*	-

Note. *p<.05

Table 4.3 *Intercorrelations of Variables of Interest at Wave II (n=994)*

Variable	1	2	3	4	5	6
1. Child age	-					
2. Child gender	-.03	-				
3. Parental warmth	.07*	-.02*	-			
4. Lack of teacher support	.02	-.02	-.25*	-		
5. Adverse classroom climate	.09*	-.02	-.002	.17*	-	
6. Internalizing problems	.04*	.07	-.17*	.24*	.25*	-

Note. *p<.05

Table 4.4 *Intercorrelations of Variables of Interest at Wave III (n=994)*

Variable	1	2	3	4	5	6
1. Child age	-					
2. Child gender	-.04	-				
3. Parental warmth	.01*	.02*	-			
4. Lack of teacher support	.02	-.03	-.20*	-		
5. Adverse classroom climate	.04	.03	-.10*	.25*	-	
6. Internalizing problems	.01*	-.03*	-.20*	.30*	.24*	-

Note: *p<.05

Multivariate Analyses

Research questions were examined using two-level growth curve models with time nested within individuals. However, before interpreting any multivariate analyses, data were screened for violations of assumptions associated with multilevel models. More specifically, Level-1 and Level-2 residuals from Model 3 (main effect model) were screened for potential violations of multicollinearity, normality, linearity, and homogeneity of variance. No assumptions appeared to be violated when predicting internalizing problems trajectory; therefore, it was presumed reasonable to conduct the two-level growth curve models for the outcome variable, using the model-building strategy presented in Chapter 3. Tables and figures documenting the examination of assumptions are found in Appendix D.

To allow comparison of models that differed in their fixed effects, the two-level growth curve models were estimated using maximum likelihood estimation. To facilitate interpretation of the intercept, age was grand-mean centered at 13.99 years old, the average age of respondents across waves in the analytic sample. All continuous predictor variables, without a meaningful interpretation of zero, were also grand-mean centered.

Table 4.5 contains summary results from the internalizing problems two-level growth curve models. In the unconditional model (Model 1), the intraclass correlation coefficient for the outcome variable was relatively moderate (ICC=.064), which indicated that 6.4% of the variance in internalizing problems existed between individuals, and the remaining variance was due to within-individual differences. Using results from the model-building process, the following four research questions are answered below.

Model Fit. For models with two-way interactions, the model fit was compared with the main effect model (Model 3) via BIC. As a result, Model 4b is a better fitting model according to BIC. The differences in BIC of Model 3 and Model 4b is 3.1, which indicates positive evidence for favoring the latter model (O'Connell & McCoach, 2008). For models with three-way interactions, the model fit was compared with the counterpart models with two-way interactions via AIC. To be specific, Model 5a was compared with Model 4a, Model 5b was compared with 4b, and Model 5c was compared with Model 4c. The results show that Model 5b is a better fitting model than Model 4b according to AIC.

Research Question 1. *What is the nature of internalizing problems among rural Chinese youth?*

1.1. What is the average level of internalizing problems in childhood? Is there variation in internalizing problems among rural Chinese youth in childhood?

1.2. How do internalizing problems change from childhood to late adolescence? Does change in internalizing problems vary among rural Chinese youth?

Results from Model 1 in Table 4.5 show that the average score of internalizing problems among sampled rural youth is 31.16 (*se*=.12) and youth vary in their internalizing

problems scores in childhood (μ_{0i}=3.11, p<.05), with a 6.4% between-individual variation to be explained by subsequent models. Model 2 in Table 4.5 shows a significant decrease in internalizing problems as youth grow up from childhood to late adolescence (β_{10}=-.60, p<.05), which represents an average decrease of 1.93% (-.60/31.16) in internalizing problems each year. Over the course of the current study from Wave I to Wave III, average levels of internalizing problems are predicted to decrease by 13.51% (1.93%* 7 years) in the sampled youth. Furthermore, the random slope effect in the Level-1 model (Model 2) is significant which indicates children vary in their linear change in internalizing problems (μ_{1i}=.38, p<.05).

Research Question 2. *Are gender and perceived school experiences associated with internalizing problems among rural Chinese youth? Are they associated with changes in internalizing problems from childhood to late adolescence among rural Chinese youth?*

To identify between-individual differences in internalizing problems for youth in childhood, gender, perceived lack of teacher support, and perceived adverse classroom climate were included in Model 3 in Table 4.5. These variables were modeled simultaneously to consider the unique contribution of each predictor while controlling for the influence of the other predictor variables as well as the study control variables. Results show that youth gender was not associated with internalizing problems in childhood (β_{01} =.30, p>.05). There were no differences between boys and girls in childhood internalizing problems. Results indicate that lack of teacher support was positively associated with internalizing problems in childhood (β_{03}=.37, p<.05). Youth who reported more lack of teacher support were predicted to have higher levels of internalizing problems. Similarly,

Table 4.5 *Parameter Estimates for Internalizing Problems Models and Models of Interest with Two-Way Interactions (n=994)*

Fixed effects	Model 1 (RQ1)	Model 2 (RQ1) Random Slope	Model 3 Main Effect (RQ2) Random Slope	Model 4a (RQ2) Random Slope	Model 4b[1] (RQ2) Random Slope	Model 4c (RQ2) Random Slope
Intercept (β_{00})	31.16*(.12)	31.16*(.12)	30.87*(.97)	30.88*(.97)	30.84*(.97)	30.91*(.97)
Child age (β_{10})		-.60*(.04)	-.52*(.04)	-.44*(.06)	-.51*(.04)	-.52*(.04)
Gender (β_{01})			.30(.23)	.30(.23)	.32(.23)	.30(.23)
Academic performance (β_{05})			-.03*(.01)	-.03*(.01)	-.03*(.01)	-.03*(.01)
Father's education (β_{06})			-.004(.03)	-.005(.03)	-.005(.03)	-.005(.03)
Family structure (β_{07})			.13(.97)	.12(.97)	.14(.97)	.10(.97)
Family SES (β_{08})			-15.92(2.54)	-15.79(2.54)	-16.14(2.53)	-.16.11(2.54)
Parental warmth (β_{02})			-.26*(.04)	-.26*(.04)	-.26*(.04)	-.26*(.04)
Lack of teacher support (β_{03})			.37*(.05)	.37*(.05)	.37*(.05)	.37*(.05)
Adverse classroom climate (β_{04})			.38*(.05)	.38*(.05)	.37*(.05)	.38*(.05)
Age*Gender (β_{11})				-.15(.08)		

Age*Lack of teacher support (β_{13})					.06*(.02)	
Age*Adverse classroom climate (β_{14})						.02(.02)
Model Fit						
-2LL	19858.8	19636.4	19403.7	19400.7	19393.7	19402.2
AIC	19862.8	19646.4	19429.7	19428.7	19421.7	19430.2
BIC	19872.6	19670.9	19493.5	19497.4	19490.4	19498.8
Error Variance						
Level-1(e_{ti})	45.68*(1.18)	38.19*(1.66)	35.23*(1.56)	35.22*(1.56)	35.09*(1.55)	35.23*(1.56)
Intercept (Child; μ_{0i})	3.11*(.60)	1.06*(.83)	.84*(.77)	.85*(.77)	.82*(.77)	.82*(.77)
Age(μ_{1i})		.38*(.10)	.39*(.10)	.38*(.10)	.39*(.10)	.39*(.10)

Note. *p<.05; ICC=.064; Child age, academic performance, father's education, family SES, parental warmth, lack of teacher support, adverse classroom climate were grand-mean centered;
Estimation Method=ML; between-within degrees of freedom;
[1] Significant interaction model; Values based on SAS Proc Mixed. Entries show parameter estimates with standard errors in parentheses.

Table 4.6 *Parameter Estimates for Internalizing Problems Models and Models of Interest with Three-Way Interactions (n=994)*

Fixed effects	Model 5a (RQ3) Random Slope	Model 5b[2] (RQ4) Random Slope	Model 5c (RQ4) Random Slope
Intercept (β_{00})	30.89*(.97)	30.93*(.97)	30.96*(.97)
Child age (β_{10})	-.44*(.07)	-.52*(.04)	-.51*(.04)
Gender (β_{01})	.32(.23)	.32(.23)	.30(.23)
Academic performance (β_{05})	-.03*(.01)	-.03*(.01)	-.03*(.01)
Father's education (β_{06})	-.004(.03)	-.004(.03)	-.006(.03)
Family structure (β_{07})	.13(.97)	.13(.96)	.08(.97)
Family SES (β_{08})	-15.95(2.54)	-15.98(2.52)	-15.98(2.53)
Parental warmth (β_{02})	-.26*(.06)	-.26*(.04)	-.26*(.04)
Lack of teacher support (β_{03})	.37*(.05)	.40*(.05)	.36*(.05)
Adverse classroom climate (β_{04})	.38*(.05)	.36*(.05)	.35*(.05)
Age*Gender (β_{11})	-.15(.09)		
Age*Parental warmth (β_{12})	-.01(.02)	-.01(.01)	-.01(.01)
Age*Lack of teacher support (β_{13})		.04*(.02)	
Age*Adverse classroom climate (β_{14})			.02(.02)
Gender* Parental warmth ($\beta_{gender*pwarm}$)	-.001(.08)		

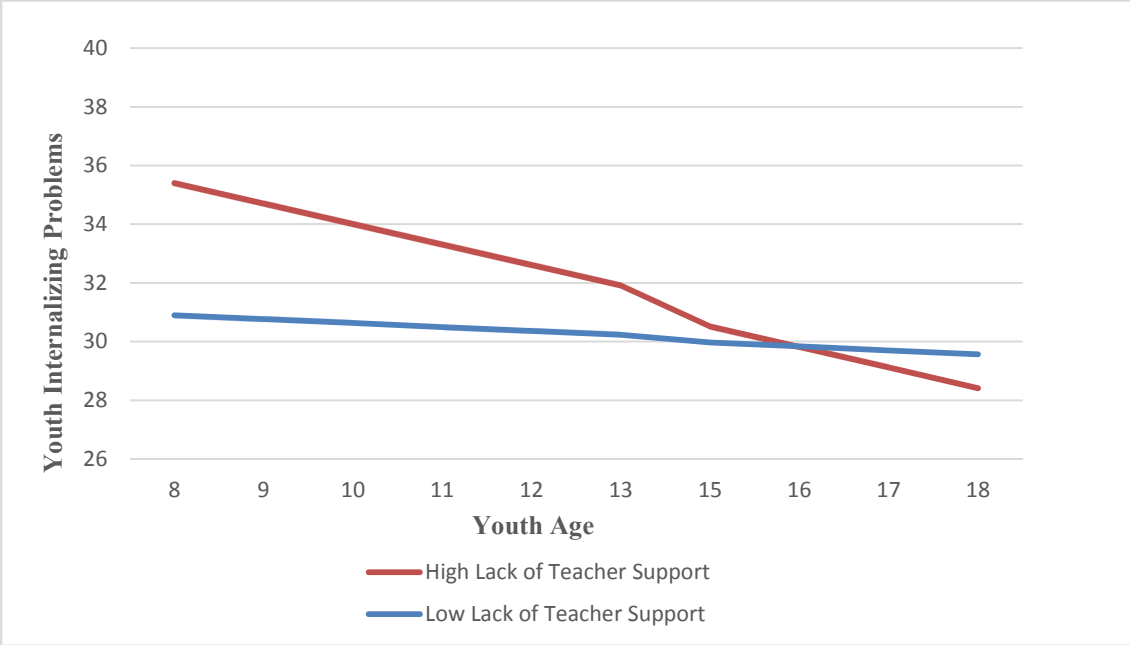
Lack of teacher support * Parental warmth ($\beta_{lts*pwarm}$)		.04*(.02)	
Adverse classroom climate * Parental warmth ($\beta_{acc*pwarm}$)			.01(.01)
Age*Gender*Parental warmth ($\beta_{age*gender*pwarm}$)	-.01(.03)		
Age*Lack of teacher support* Parental warmth ($\beta_{age*lts*pwarm}$)		-.003(.01)	
Age*Adverse classroom climate* Parental warmth ($\beta_{age*acc*pwarm}$)			.02*(.01)
Model Fit			
-2LL	19399.6	19385.1	19390.7
AIC	19433.6	19419.1	19424.7
BIC	19516.9	19502.4	19508.1
Error Variance			
Level-1(e_{ti})	35.24*(1.56)	35.06*(1.55)	35.45*(1.57)
Intercept (Child; μ_{0i})	.82*(.77)	.77*(.77)	.65*(.77)
Age(μ_{1i})	.38*(.10)	.39*(.10)	.36*(.10)

Note. *p<.05; ICC=.064; Child age, academic performance, father's education, family SES, parental warmth, lack of teacher support, adverse classroom climate were grand-mean centered;
Estimation Method=ML; between-within degrees of freedom;
[2] Significant interaction model
Values based on SAS Proc Mixed. Entries show parameter estimates with standard errors in parentheses.

adverse classroom climate was found to be positively associated with internalizing problems in childhood (β_{04}=.38, p<.05). Youth who reported more adversity in their classrooms were predicted to have higher levels of internalizing problems.

To examine between-individual differences in the internalizing problems trajectory, the interactions between gender and age, between lack of teacher support and age, and between adverse classroom climate and age were added in Models 4a-4c in Table 4.5, respectively. Results in Model 4a show that although there is a negative relationship between gender and changes in internalizing outcomes, the relationship is not significant (β_{11}=-.15, p>.05). There were no differences between boys and girls in changes in internalizing problems from childhood to late adolescence. Results in Model 4b demonstrate that lack of teacher support plays a significant role in changes in youth internalizing problems (β_{13}=.06, p<.05). Youth who reported more lack of teacher support were predicted to have a steep downward trajectory of internalizing problems in the developmental period examined, which indicates the effect of lack of teacher support is more detrimental in childhood compared to adolescence. The trajectory of internalizing problems by lack of teacher support is plotted in Figure 4.1. The significant differences on internalizing problems between the effects of higher levels of lack of teacher support (high level is defined as the value for the 75th percentile) and lower levels of lack of teacher support (low level is defined as the value for the 25th percentile) are evident in childhood from age eight to eleven. Results in Model 4c show that there is no significant effect of adverse classroom climate on the rate of changes in internalizing problems from childhood to late adolescence (β_{14}=.02, p>.05).

Research Question 3. *Do perceived parental behaviors moderate the effect of gender on internalizing problems in childhood among rural Chinese youth? Do perceived parental behaviors moderate the effect of gender on changes in internalizing problems among rural Chinese youth?*



Note. Youth age was grand-mean centered at 14.

Figure 4.1 The effect of perceived lack of teacher support on internalizing problems trajectory

Model 5a in Table 4.6 is employed to examine to whether the level of parental warmth moderated the relationship between gender and internalizing problems in childhood and the trajectory from childhood to late adolescence. Results show that the moderating role of parental warmth on the relationship between gender and internalizing problems in childhood is not supported (βgender*pwarm=-.001, p>.05), which means no significant interaction effects between gender and parental warmth on youth internalizing problems have been revealed. Thus, the relationship between youth gender and

internalizing problems in childhood does not differ by the level of parental warmth perceived.

Similarly, results show that the moderation effect of parental warmth does not exist in the relationship between youth gender and internalizing problems trajectory (βage*gender*pwarm =-.01, p>.05), in other words, there is no significant interactions between gender, parental warmth, and youth age. Thus, the relationship between youth gender and internalizing problems trajectory does not differ by the level of parental warmth youth perceived.

Research Question 4. *Do perceived parental behaviors moderate the effect of school experiences on internalizing problems in childhood among rural Chinese youth? Do perceived parental behaviors moderate the effect of perceived school experiences on changes in internalizing problems among rural Chinese youth?*

Analyses were conducted to examine to what extent the level of parental warmth moderates the relationship between school experiences and internalizing problems in childhood in Model 5b and Model 5c displayed in Table 4.6. Moderating role of parental warmth on the relationship between lack of teacher support and internalizing problems in childhood is supported among sampled rural Chinese youth in Model 5b (βlts*pwarm=.04, p <.05), which means parental warmth is a protective factor in childhood internalizing problems when youth perceive limited support from teachers. As the level of lack of teacher support keeps the same, every one unit increase in the level of parental warmth lead to .04 unit increase in internalizing problems. Compared to every one unit increase in lack of teacher support, .40 unit increase in internalizing problems originally, parental

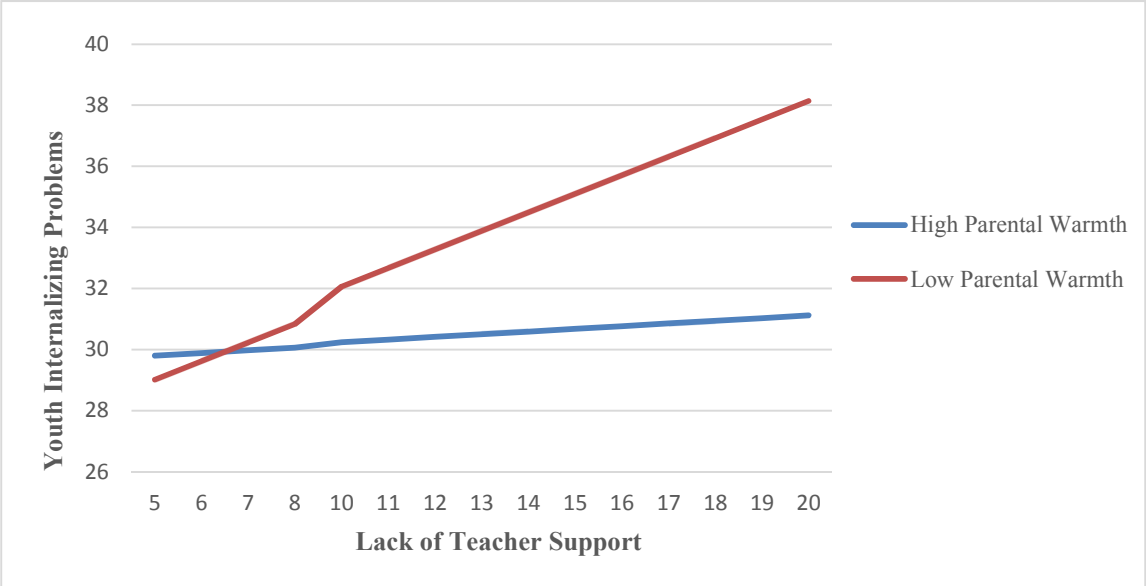
warmth did diminish the relationship between lack of teacher support and youth internalizing problems in childhood.

Figure 4.2 shows the moderating effect of parental warmth on lack of teacher support. As all else being equal, youth in the analytic sample with higher levels of lack of teacher support had higher internalizing problems scores, but the magnitude of the effect differed according to the level of parental warmth. The magnitude of the effect of lack of teacher support on youth internalizing problems is bigger for youth perceive lower levels of parental warmth (low level is defined as the value for the 25th percentile) than those perceive higher levels of parental warmth (high level is defined as the value for the 75th percentile), as shown by the red steeper line in Figure 4.2. High levels of lack of teacher support combining with low levels of parental warmth predict the highest internalizing problems scores.

A moderating role of parental warmth on the relationship between adverse classroom climate and internalizing problems in childhood is not supported in Model 5c (βacc*pwarm=.01, p>.05). Thus, the relationship between adversity in classrooms and internalizing problems in childhood does not differ by the level of parental warmth youth perceived. In other words, parental warmth is not a protective factor in childhood internalizing problems when youth perceive adversity in classroom.

Model 5b in Table 4.6 also includes the interactions between age, perceived parental warmth and lack of teacher support (βage*lts*pwarm =-.003, p>.05), which is not significant. The results from Model 5b indicate that perceived parental warmth does not moderate the effect of perceived lack of teacher support on changes in internalizing problems. In other words, the relationship between lack of teacher support and

internalizing problems trajectory from childhood to late adolescence does not differ by the level of parental warmth youth perceived during the developmental period examined. Thus, parental warmth is not a protective factor in the trajectory of youth internalizing

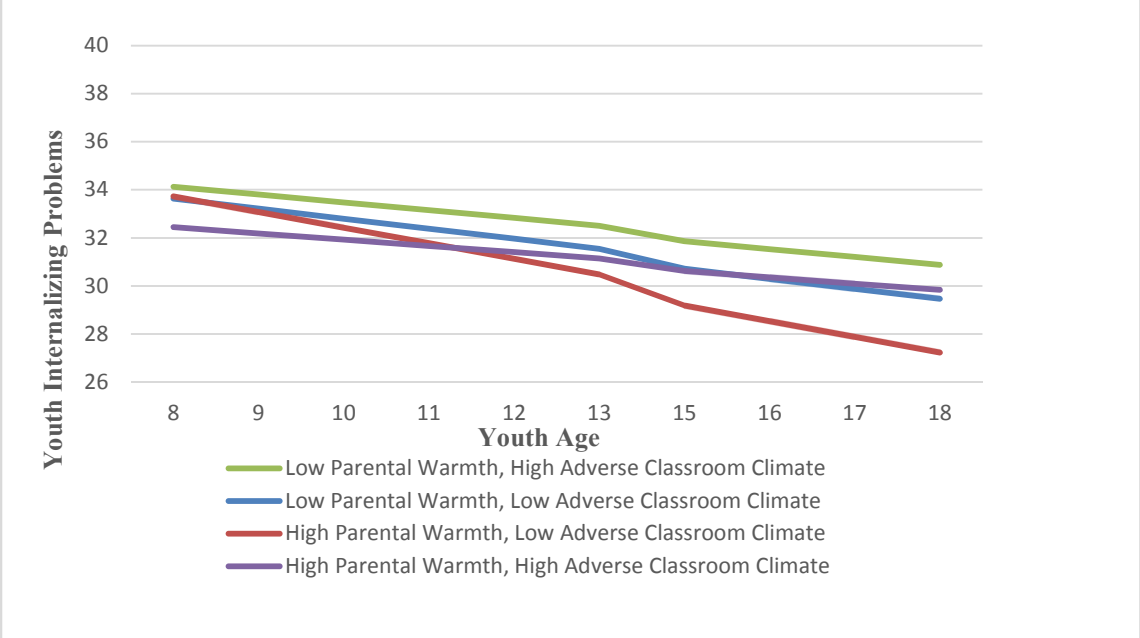


Note. The scores of lack of teacher support was grand-mean centered at 9.

Figure 4.2 The moderating effect of perceived parental warmth on lack of teacher support in childhood (age_{mean}=13.99) internalizing problems

problems when youth perceive limited support from teachers. Furthermore, Model 5c includes the interactions between age, perceived parental warmth and adverse classroom climate (βage*acc*pwarm=.02, p<.05), which is significant. The results from Model 5c indicate that perceived parental warmth moderates the effect of adverse classroom climate on internalizing problems trajectory, which means the relationship between adverse classroom climate and internalizing problems trajectory from childhood to late adolescence differs by the level of parental warmth youth perceived during the developmental period examined.

Figure 4.3 shows the three-way interactions between age, perceived parental warmth, and perceived adverse classroom climate. As all else being equal, youth in the analytic sample with higher parental warmth (high level is defined as the value for the 75th percentile) and lower adverse classroom climate (low level is defined as the value for the 25th percentile) scored the lowest in the internalizing problems trajectory, whereas youth perceived lower parental warmth (low level is defined as the value for the 25th percentile) and higher adverse classroom climate (high level is defined as the value for the 75th percentile) scored the highest. It is noted that parental warmth moderated the negative impact of school experiences on the trajectory among youth perceive low levels of adverse classroom climate more so than youth perceive high levels of adverse classroom climate.



Note. Youth age was grand-mean centered at 14.

Figure 4.3 The moderation effect of perceived parental warmth on the relationships between adverse classroom climate and internalizing problems trajectory

CHAPTER 5

DISCUSSION

The present study extends beyond past research by illuminating the trajectory of internalizing problems from childhood to late adolescence among rural Chinese youth, and investigating changes in the associations between individual characteristics and internalizing problems over an eight-year period. The present study is also among the first to examine the moderating effect of parental warmth on these relations as children transition into adolescence. To be detailed, first, the overall developmental trajectory of internalizing problems from childhood to late adolescence among rural Chinese youth was examined. Second, we investigated whether gender and perceived school experiences co-varied with internalizing problems over time. Third, we determined if the associations between gender, perceived school experiences, and internalizing problems were moderated by the effect of parental warmth over time.

This chapter discusses the results of the current study and how these results correspond within the current knowledge of youth internalizing problems trajectory and risk and protective factors in multiple contexts. Additionally, this chapter explores implications of the findings in regards to social work research and practice in China. To conclude, limitations of this study and directions for future research are discussed.

Developmental Trajectory of Internalizing Problems as Children Transition into Late Adolescence

Youth varied in their initial status of internalizing problems in childhood and their change in internalizing problems over time, with a decrease in youth-report internalizing problems as they grew older. The average degree of internalizing problems for youth in childhood was approximately 31, echoing the findings of previous research that examined internalizing problems of youth in rural Gansu areas applying single wave data (Davidson & Adams, 2013).

On average, participants in this study were found to experience significant decreases in levels of internalizing problems over the eight years. This is in contrast with previous research indicating that internalizing problems increase from childhood to late adolescence (Galambos et al., 2004; Garber & Flynn, 2001; Yi et al., 2009). One possible explanation is that youth are trained to regulate negative emotions that hinder harmonious social interactions since very young age in China, and they increasingly acquire the ability to maintain emotional equanimity as time goes by (Chen & Liu, 2012). In addition, contrary to past studies which suggested that increases in conflicts with parents lead to increases in internalizing problems during adolescence (Galambos et al., 2003), rural youth reported more parental warmth in late adolescence than in childhood in the current study, which might contribute to the downward trajectory of internalizing problems among this group of youth. On the one hand, parental behaviors may fluctuate with youth age, which might involve more punitive discipline when children were younger and then transit to more gentle reasoning when children grow up (Chen & Liu, 2012). On the other hand, from the life course perspective, the same level of parental warmth might be

perceived differently by children depending on their developmental stage. It is possible that more parental warmth may be perceived by older than younger children as they have better cognitive capacity to appreciate the efforts of their parents to raise them in disadvantaged conditions. At the same time, along with the economic development in China, rural youth and parents are benefited from increased household incomes and accessibility to education resources on internet. A combination of these factors may explain the observed downward trajectory of internalizing problems from childhood to late adolescence among the sampled rural youth.

As a rapidly developing country with booming urbanization, China has paid scant attention to youth psychological outcomes in rural areas. However, given that the rural youth will soon become pillars of future China with their urban counterparts, their mental well-being should not be ignored. Social workers in China have the potential to advocate for national mental health policies to recognize and address mental health problems among rural youth. These include training mental health providers and establishing service system in village level. Furthermore, social workers there are well positioned to remove cultural barriers to help-seeking for mental health problems and improve the accessibility and affordability of mental health services for rural residents.

Time-Varying Covariation between Individual Characteristics and Internalizing Problems

Gender. In contrast with studies that report internalizing problems trajectory may fluctuate with youth gender in both Western (Galambos et al., 2004; Ge et al., 2001; Hankin et al., 1998) and Chinese context (Cohen et al., 2015; Wang et al., 2015; Wu et al., 2010; Yang et al., 2004), this study revealed that changes in the course of internalizing

problems did not differ by gender. To be detailed, female youth did not report higher levels of internalizing problems than male youth in childhood as expected, and did not report more rapid levels of change in internalizing problems than male youth across the three waves. For both gender groups, because the analytic sample was limited to rural youth who stayed in school and participated the research project from 2000 to 2007, youth at risk of psychological malfunctioning may dilute in the study or dropped out of school. The female youth, who enrolled in school across the developmental stage examined, might receive less gender bias and more family resources from parents compared to those that dropped out of school to support male siblings, which protected them from internalizing problems. That said, multivariate analyses including school drop-outs across the three waves were also conducted to investigate possible gender differences in internalizing problems trajectory, but no significant results were found. It is possible that there is reduced son preference in rural areas due to the spread non-farm employment there as modernization proceeds.

In current study, rural girls report similar levels and courses of internalizing problems with rural boys. This finding might also be attributed to that sons were pinned great hopes on by their parents which might make them feel stressful and possibly deteriorate their psychological functioning. This may be especially applicable for boys from economically deprived families in rural China, who receive the majority of household resources and are expected to become academically outstanding and bring the whole family out of poverty eventually. In addition, the culturally-adapted measurement of internalizing problems might not be relevant and comprehensive in examining youth psychological functioning among rural youth, therefore, it seems appropriate for future

qualitative research to further our understanding of the relationship between gender and psychological functioning among rural Chinese youth by examining the mechanisms behind the relationships.

Lack of Teacher Support. As expected, findings demonstrated that the level of lack of teacher support was positively associated with internalizing problems in childhood and the effect remained stable over time during the transition from childhood to late adolescence. Findings support previous research that illuminated the association between lack of teacher support and internalizing problems in developed countries (Reddy et al., 2003; Rueger et al., 2014). Our findings from rural populations of children and adolescents in China are consistent with literature from Western and developed regions, suggesting that the role of teacher support across cultures may be more convergent than divergent (Jia et al., 2009).

Our study is innovative by examining the effect of lack of teacher support on the longitudinal course of internalizing problems among rural Chinese youth. The effect of lack of teacher support on levels of internalizing symptoms was weaker in childhood in comparison to its effects in late adolescence, which is consistent with patterns reported in the previous literature (e.g., Yi et al., 2009). When youth face the National College Entrance Examination (the most competitive exam in China) and are under tremendous pressure to improve academic performance, lack of teacher support, especially emotional and academic support, becomes more harmful than usual on youth psychological functioning.

Prior research suggests that insufficient teacher support likely leads to behavior problems and poor academic performance (Jia et al., 2009; Way et al., 2007).

Contributing to this literature base, the current study shows the detrimental effects of lack of teacher support on youth psychological functioning in rural China. This finding underscores the importance of teachers for rural school youth, and implies that programs directed at helping teachers to support youth mental health are needed. Because Chinese teachers typically spend long hours with their students daily and retain the same group of students for several years, they have great opportunity to develop a healthy relationship with students and provide support as needed. Through caring for students, treating them fairly, engaging them in learning, and promoting their mental well-being, teachers are taking important roles in reducing internalizing problems at a time of unique vulnerability for youth.

Adverse Classroom Climate. The findings demonstrating significant effects of adverse classroom climate on internalizing symptoms in childhood are consistent with previous research focused on early (Jia et al., 2009; Kuperminc et al., 2001; Way et al., 2007) and late adolescence (Li et al., 2016). However, adverse classroom climate was not significantly associated with the rate of change of these symptoms across the developmental period examined in the current study, which is contrast with previous research (Way et al., 2007). Specifically, the effects of adverse classroom climate on levels of psychological adjustment were stronger in mid to late adolescence in comparison to its effects in childhood. This is consistent with patterns reported in the previous literature (e.g., Meadows, Brown, & Elder, 2006), which supports that adolescence is a time of shifts in social relationships and an increasing reliance on peers for social interactions.

In contrast with the previous research (e.g., Way et al., 2007), youth reported decreasing adverse classroom climate scores from mid to late adolescence. This decline in perceptions of adverse classroom climate may be based on a growing match between what students need (e.g., orderly learning environment and respectful peers) and what the school actually provides. In rural China, villages typically only have primary schools. Thus, youth have to go to the surrounding county or town to enroll in middle schools, which usually have better teaching quality and learning climate compared with village schools (Adams & Hannum, 2016). Also, youth who undergo peer delinquency and aggression might have left school due to classmates' victimization (Adams & Hannum, 2016). These intertwined factors might explain the reason that students who remained in school in Wave III reported lowest levels of adverse classroom climate.

Social workers in rural China may engage large rural teachers and students to promote change in the school contexts. The current study suggests the importance of understanding how the school context can provide opportunities for healthy youth development and ways that schools may reduce internalizing problems including enhancing teacher support and healthy classroom environment. Social workers there must assume the responsibility of translating the knowledge into effective practice that will help enhance the well-being of this population for the future of our society. Example strategies to foster teacher-student relationships include social workers may provide professional development to rural teachers on meeting the diverse cognitive, emotional, and social needs of their students, and on creating trusting and caring relationships that promote open communication with students and families (Center for Disease Control [CDC], 2009). At the same time, social workers may also work with school personnel to

reinforce anti-bully and discipline policies and assist teachers to explore strategies to address bullying and discipline violation in the classroom. In addition, social workers may collaborate with teachers in the delivery of a social emotional curriculum which teach youth interpersonal and emotional management skills. The Whole School, Whole Community, Whole Child (WSCC) program by CDC could be adapted and tailored to be employed among rural youth in China. The program offers a potential means for improving both learning and health by increasing youth cognitive skills and attitude, positive behaviors, academic performance and social outcomes (CDC, 2015).

The Effect of Parental Warmth on the Time-Varying Covariation between Gender and Internalizing Problems

Our study also investigated whether the relationship between gender and internalizing problems in childhood and across time varied by the level of perceived parental warmth. In the multilevel analysis, neither the association between gender and internalizing problems in childhood nor the association between gender and the trajectory was significantly moderated by perceived parental warmth. This finding indicates there is no evidence that parental warmth influences changes in the internalizing problems differently for boys and girls. The results from this study were consistent with the existing literature that demonstrates no gender difference in the effects of parental warmth on internalizing outcomes (Demaray & Malecki, 2002; Malecki & Demaray, 2003; Rueger et al., 2008) and no significant interactions between gender and perceived parental warmth on the course of psychological functioning (Rueger et al., 2014).

Though not the focus of current study, it is noted that boys reported experiencing higher levels of parental warmth than did girls at Wave I and Wave III, but similar levels

at Wave II. Although the current study did not find evidence that girls were more vulnerable to internalizing problems, the results indicate that rural girls were more likely to perceive less parental warmth compared with rural boys in childhood and late adolescence. Given the gender differences in the level of perceived parental warmth in where rural families are permitted to have more than one child, family intervention programs should put effort into encouraging parents to pay more attention to their female children and to be caring, supportive, and responsive to their unique needs. This finding informs social workers in China of the significant role they may play in ameliorating the internalizing symptoms of female children and adolescents, that is, to improve the family context by facilitating greater parental warmth in female children. At the same time, social workers there should continually work on reducing gender inequality and promoting women's rights on the national scale.

The Effect of Parental Warmth on the Time-Varying Covariation between Perceived School Experiences and Internalizing Problems

The levels of parental warmth significantly moderated the relationship between lack of teacher support and internalizing problems in childhood among rural Chinese youth. However, levels of parental warmth did not significantly moderate the time-varying covariation between lack of teacher support and internalizing problems. Thus, parental warmth is not a protective factor in youth internalizing problems trajectory as expected.

Findings from the current study complement and contradict findings from other published studies. The statistically significant interactions between parental warmth and lack of teachers support on childhood internalizing problems were consistent with other research findings (Davidson & Adams, 2013; Rueger et al., 2014). This finding

underscores the importance of parents as a resilient source for children and adolescents across cultures, and implies that programs directed at helping parents to support youth mental health may have positive impacts on youth development (Colarossi & Eccles, 2003; Davidson & Adams, 2013; Rueger et al., 2014).

Yet, no significant interactions between parental warmth and lack of teacher support on the rate of change in internalizing problems contradict findings from previous research (Rueger et al., 2014). The transition to adolescence has been conceptualized as a time when youth's social world expands, with relationships with teachers and peers formed during this period having increased developmental salience. Thus, it is possible that during the developmental period examined, the negative effect of lack of teacher support overwhelms the positive effect of parental warmth, thus no moderation effect of parental warmth has been observed.

The levels of parental warmth did not significantly modify the relationship between perceived adverse classroom climate and internalizing problems in childhood among rural Chinese youth. Findings contrasted with previous research showing that high level of parental warmth was protective youth from internalizing malfunctioning when they experience negative classroom climate (Rigby, 2000). It is possible that rural Chinese youth who were between the ages of 9 to 14 were likely to experience the transition from primary to middle schools. As youth navigate the new school context, and naturally spend more time and seek close relationships with peers, the impact of school climate might be greater than the impact of parenting practices. That said, in the long run, parental warmth significantly moderated the relationship between adverse classroom climate and internalizing problems trajectory from childhood to late adolescence. Thus,

an ongoing warm relationship between a child and his/her parents is crucial to maintain and enhance youth healthy functioning, especially when they experience some hardships in school settings. These most immediate social contexts (i.e., family and school) youth residing in could work in collaboration to promote youth psychological functioning.

A better understanding of the complex interplay among the risk and protective factors in family and school contexts and youth psychological malfunctioning would guide the development of effective prevention and intervention programs to ameliorate their internalizing problems. Especially when resources for professional services in rural China are quite limited, knowing what risk factors are in school context as well as how parental warmth serves as a buffering quality against adverse mental health outcomes would lead to the most efficient investment in strengthening certain domains of parenting practices and enhancing the capacity of service programs to promote the mental well-being of rural youth. Creating a healthy environment includes not only engaging teachers and peers, but also parents and community members. Social workers may work with village leaders and members to implement tailored programs to educate parents on constructive means to provide support to their children and address misbehaviors of their children if they have any. Considering the limited schooling the rural residents have and general financial hardships they face, the feasibility and sustainability of social programs should be emphasized.

Summary of Findings

The current investigation adds to the literature by examining the unique effects of gender, lack of teacher support, and adverse classroom climate on internalizing symptoms from childhood to adolescence with consideration for moderation role of parenting

behaviors. Results documented that youth in rural China varied in their initial status of internalizing problems and their change in internalizing problems, with a decrease in youth-report internalizing scores from childhood to late adolescence. In addition, there was no gender difference in internalizing symptoms in childhood and during the developmental stage examined. The level of lack of teacher support was positively associated with internalizing problems and the effects remained stable from childhood to late adolescence. The level of adverse classroom climate predicted youth internalizing problems in a positive direction, but was not significantly associated with the rate of change in internalizing symptoms across the developmental period examined. Finally, the association between lack of teacher support and internalizing problems in childhood differed by the level of parental warmth, as well as the time-varying covariation between adverse classroom climate and the internalizing problems trajectory. The results from the current study add to the growing literature that documents the continued importance of parents in the lives of youth as they mature, especially when youth experience interpersonal hardships with teachers and/or peers at school. Taken together, our results suggest that future research should continue to focus on the independent and interactive effects of gender, parental warmth, lack of teacher support, and adverse classroom climate among rural Chinese youth, and examine these effects longitudinally using multiple time points of data during this potentially challenging time period in order to inform prevention and interventions efforts both at home and in the schools.

Limitations and Future Directions

As with all secondary data analyses, this study has several methodological limitations. First, the researcher is limited to the variables available in the dataset and the

manner in which they were measured. For example, the predictors that might cause youth psychological malfunctioning, such as child abuse/neglect and domestic violence in rural China were not surveyed in GSCF, which limits our ability to detect relationships between these variables and youth internalizing symptoms. In addition, the predictor measurement on lack of teacher support is not psychometrically robust in the current analysis, it is possible that the effects of the predictor might have been suppressed by the way it was measured. To be detailed, the measurement asked students to think about their teachers collectively rather than focusing on individual teachers. It is possible that perceptions of lack of support from a specific teacher could have revealed a stronger impact than was detected in the current study. According to previous line of research (Davis et al., 1998), the impacts of general versus relationship-specific social support were different. Thus, an assessment of support perceived from a particular teacher may demonstrate greater effect on youth mental outcomes than examining perceptions of general support from the teachers group, particularly in the context of Chinese homeroom teacher system. It is highly possible there is a greater effects of perceived lack of homeroom teacher support on youth psychological functioning than of other teachers. At the same time, given lack of teacher support measurement having low reliability but significant interaction effects with other parameters, inflated Type I errors might be caused by this measurement. Second, the construct validity of predictor and outcome measurements needs further investigation. For example, cheating in exams might not be reconciled with bullying in the measurement of adverse classroom climate. More effort should be made to explore indigenous or culturally-adapted measurements of parenting practices, school experiences, and youth psychosocial development. Third, data for the present study relied solely on self-reports of

predictor and outcome measures. Youth were asked to report on their psychological functioning, and may have underrated their experiences in order to avoid the stigma associated with being identified as suffering mental illness. Likewise, youth's perceptions of family and school experiences may vary depending on the current relationship status with their parents, teachers, and peers. Future studies that draw from multi-informant sources, including parent/teacher reports of emotional support they provide and youth internalizing problems, which could be used to validate responses. Future research may also take a further step in employing qualitative design that may promote our understanding of the relationship between individual and contextual factors in affecting mental health of rural Chinese youth. Fourth, given that village is also one of the most immediate social contexts in which rural youth function, risk and protective factors embedded in rural community need to be discerned for their effects on youth psychological functioning, as well as their relations to other factors in family and school contexts. Future research should pay attention to the effect of village community context on youth development, a factor that is missing in the present study. Finally, the sample in the present study was drawn from youth from rural schools in Northwest China. Less is known about the effect of gender, perceived parental warmth, lack of teacher support and adversity in classrooms on trajectories of internalizing problems among youth with differing socioeconomic status or in other areas of China. Given previous studies have reported variations in internalizing symptoms when compared urban and rural youth in different parts of China (Abela et al., 2011), future research is needed to determine if findings can be generalized to youth in other areas of China.

Implications for Social Work Practice

Results of the study emphasize the importance of fostering responsive and supportive relationships within the family context early on and continually, so that youth can have a consistent foundation from which they can draw support. This becomes particularly important during the transition from childhood into adolescence, where youth often experience personal and institutional transitions that may bring changes to the levels of emotional support received from parents. Community and school social workers in China have the potential to impact youth mental health by consulting parents on strategies to improve family environment thus improving the overall psychological functioning of youth. Within the family context, youth need to know that they can approach their parents to disclose and discuss hardships and conflicts with teachers and peers that they may be experiencing in school. Also, training can give parents the strategies to initiate consistent conversations with their children that involve asking what the hardships and conflicts are about and brainstorming solutions with their children to be used in facing these situations. This offers youth support and also maintains a relationship that allows for open communication when they need to seek help. Children and adolescents will also acquire new approaches to employ in resolving future conflicts with other contexts.

Present findings also provide a basis for the development of effective prevention and intervention programs in order to prevent and diminish the association between school adversities and internalizing problems. Teachers can be an important source of emotional support for children and adolescents. Social workers that focus on youth development in China are well positioned to develop, implement, and support prevention and intervention programs geared towards youth psychological functioning. Training that targets teacher professional development in a way that improves rural teachers' means of providing

emotional, instrumental, and informational support to students, managing classroom techniques to reduce incidents of classroom disruption, noticing student delinquency and victimization, and understanding of classroom ecology associated with youth psychological functioning could be an effective strategy for keeping students to feel cared for and supported. Our findings highlight the important role that rural teachers can play in detecting and responding to psychological malfunctioning among rural Chinese youth. Prevention programs can help teachers increase internalizing problems awareness, identify warning signs of the symptoms and suicide among youth, and equip them with the appropriate skills and responses to use when youth approach them for help.

Furthermore, curricula in classroom and school-based programs can teach youth to use respectful and supportive responses when interacting with peers, limit classroom disruption and delinquent behaviors, and promote orderly climate in classroom and school contexts. For example, role-playing activities can allow youth to devise and practice strategies to resolving conflicts peacefully within their friendships, rather than resorting to physically aggressive responses towards one another. These strategies could also encourage youth to obey school rules and teach youth to how to provide support for their friends if they are approached for help. As research has consistently demonstrated school climate has the potential to positively influence students' learning and psychological development, school personnel should take efforts to incorporate evidence-based climate assessment and improvement strategies into their policies and practice to enhance student outcomes. Social workers may collaborate with school personnel to explore possible strategies to integrate initiatives.

Our findings are extremely valuable for policymakers interested in improving the psychological functioning of rural youth in China. Our findings can support these efforts by informing the educational and social policies to promote protective factors in youth mental health. These efforts might include interventions ranging from parent and teacher education programs, peer support initiatives, to school policy approaches. By focusing the spotlight on parents, teachers, and classrooms rather than individual students, families and schools might be more involved in creating a healthy environment that promotes social-emotional development of rural youth.

In closing, youth developmental trajectory is influenced by numerous protective and risk factors. Families and schools have the opportunity to provide protective factors to youth. Continued research is needed on the interaction and influence of personal characteristics and ecological contexts on youth development. Future research should continue to consider roles played by parents, teachers, and peers during the transition from childhood to late adolescence to have a better understanding of protective and risk factors related to internalizing symptoms during the developmental period examined.

REFERENCES

Abela, J. R. Z., Stolow, D., Mineka, S., Yao, S., Zhu, X. Z., & Hankin, B. L. (2011). Cognitive vulnerability to depressive symptoms in adolescents in urban and rural Hunan, China: a multiwave longitudinal study. *Journal of Abnormal Psychology, 120*(4), 765-778. doi: 10.1037/a0025295.

Achenbach, T. M. (1991). *Manual for the youth self-report and 1991 profile.* Burlington, VT: University of Vermont, Department of Psychiatry.

Adams, J., & Hannum, E. C. (2016). School violence in China: A multi-level analysis of student victimization in rural middle schools. *Gansu Survey of Children and Families Papers*, Paper 56. http://repository.upenn.edu/gansu_papers/56

Anderson, A. R., Christenson, S. L., Sinclair, M. F., & Lehr, C. A. (2004). Check & connect: The importance of relationships for promoting engagement with school. *Journal of School Psychology, 42*, 95–113. doi: 10.1016/j.jsp.2004.01.002.

Bayer, J. K., Sanson, A. V., & Hemphill, S. A. (2006). Parent influences on early childhood inernalizing difficulties. *Journal of Applied Developmental Psychology, 27*(6), 542-559. doi: 10.1016/j.appdev.2006.08.002.

Bell, B. A., Schoeneberger, J. A., Morgan, G. B., Ferron, J. M., & Kromrey, J. D. (2010). Fundamental Diagnostics for Two-Level Mixed Models: The SAS Macro MIXED_DX. Proceedings of the annual SAS Global Forum.

Beyers, J. M., Bates, J. E., Pettit, G. S., and Dodge, K. A. (2003). Neighborhood structure, parenting processes, and the development of youths' externalizing behaviors: A multilevel analysis. *American Journal of Community Psychology, 31*, 35–53. doi: 10.1023/A:1023018502759.

Bradshaw C. P., Sawyer A. L., O'Brennan L. M. (2009). A social disorganization perspective on bullying-related attitudes and behaviors: The influence of school context. *American Journal of Community Psychology, 43*(3-4), 204–220. doi: 1007/s104640099240-1.

Bronfenbrenner, U. (1979). *The Ecology of Human Development*. Cambridge: Harvard University Press.

Brown, K., Covell, K., & Abramovitch, R. (1991). Time course and control of emotion: Age differences in understanding and recognition. *Merrill-Palmer Quarterly, 37*, 273–287.

Buyse, E., Verschueren, K., Doumen, S., Van Damme, J., & Maes, F. (2008). Classroom behavior and teacher-child relationships in kindergarten: The moderating role of classroom climate. *Journal of School Psychology, 46*, 367–391. doi: 10.1016/j.jsp.2007.06.009.

Center for Disease Control and Prevention (2009). *School Connectedness: Strategies for increasing protective factors among youth.* Atlanta, GA. Retrieved October 13, 2017 https://www.cdc.gov/healthyyouth/protective/pdf/connectedness.pdf

Center for Disease Control and Prevention (2015). *Whole school, whole community, whole child*. Atlanta, GA. Retrieved October 13, 2017 https://www.cdc.gov/healthyschools/wscc/WSCCmodel_update_508tagged.pdf

Chen, C., Greenberger, E., Farruggia, S., Bush, K., & Dong, Q. (2003). Beyond parents and peers: The role of important non-parental adults (VIPs) in adolescent development in China and the United States. *Psychology in the Schools, 40*, 35–50. doi: 10.1002/pits.10068.

Chen, X., & Li, B. (2000). Depressed mood in Chinese children: Development significance for social and school adjustment. *International Journal of Behavioral Development, 24*, 472–479. doi: 10.1080/016502500750038026.

Chen, X., Li, D., Li, Z., Li, B., & Liu, M. (2000). Sociable and prosocial dimensions of social competence in Chinese children: Common and unique contributions to social, academic, and psychological adjustment. *Developmental Psychology, 36*, 302–414. doi: 10.1037/0012-1649.36.3.302.

Chen, J. J. & Liu, X. (2012). The mediating role of perceived parental warmth and parental punishment in the psychological well-being of children in rural China. *Social Indicators Research, 107*, 483-508. doi: 10.1007/s11205-011-9859-9.

Chen, X., Liu, M. W., & Li, B. (2000). Parental warmth, control, and indulgence and their relations to adjustment in Chinese children: A longitudinal study. *Journal of Family Psychology, 14*, 401–419. doi: 10.1037/0893-3200.14.3.401.

Chen, X., Rubin, K. H., Liu, M., Chen, H., Wang, L., Li, D., Gao, X., Cen, G., Gu, H., & Li, B. (2003). Compliance in Chinese and Canadian toddlers: A cross-cultural study. *International Journal of Behavioral Development, 27*, 428–436. doi: 10.1080/01650250344000046.

Choi, E. J., & Hwang, J. (2015). Child gender and parental inputs: no more son reference in Korea? *American Economic Review: Papers and Proceedings*, *105*(5), 638-643. doi: 10.1257/aer.p20151118.

Cohen, J. R., Sheshko, D. M., Ames, A. M., Young, J. F., Hansford, A. P., Zhu, X., Yao, S., & Abela, J. R. Z. (2015). Self-perceived competence in mainland China: a multiwave longitudinal examination of internalizing symptoms in Chinese adolescents. *Journal of Research on Adolescents, 25*(3), 564-579. doi: 10.1111/jora.12146.

Colarossi, L. G., & Eccles, J. S. (2003). Differential effects of support providers on adolescents' mental health. *Social Work Research, 27*(1), 19-30. doi: 10.1093/swr/27.1.19.

Connelly, R. & Zheng, Z. (2003). Determinants of school enrollment and completion of 10 to 18 year olds in China. *Economics of Education Review, 22*, 379-388. doi:10.1016/S0272-7757(02)00058-4.

Cornwell, B. (2003). The dynamic properties of social support: Decay, growth, and staticity, and their effects on adolescent depression. *Social Forces, 81*, 953–978.

Costello, E. J., Mustillo, S., Erkanli,A., Keeler, G. & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry, 60*(8), 837-844. doi: 10.1001/archpsyc.60.8.837.

Dallaire, D. H., Pineda, A. Q., Cole, D. A., Ciesla, J. A., Jacquez, F., LaGrange, B., & Bruce, A. E. (2006). Relation of positive and negative parenting to children's depressive symptoms. *Journal of Clinical Child and Adolescent Psychology, 35*, 313–322. doi: 10.1207/s15374424jccp3502_15.

Davidson, S., & Adams, J. (2013). Adversity and internalizing problems among rural Chinese adolescents: the roles of parents and teachers. *International Journal of Behavioral Development, 37*(6), 530-541. doi: 10.1177/0165025413503421.

Davis, H. A. (2003). Conceptualizing the role and influence of student-teacher relationships on children's social and cognitive development. *Educational Psychologist, 38*(4), 207234. doi: 10.1207/S15326985EP3804_2.

Davis, M. H., Morris, M. M., & Kraus, L. A. (1998). Relationship specific and global perceptions of social support: Associations with well-being and attachment. *Journal of Personality and Social Psychology, 74*, 468–481. doi: 10.1037/00223514.74.2.468.

Demaray, M. K., & Malecki, C. H. (2003). Perceptions of the frequency and importance of social support by students classified as victims, bullies, and bully/victims in an urban middle school. *School Psychology Review, 32*(3), 471-489. doi:

10.1111/j.1939-0025.2011.01132.x.

Elder, G. H., Johnson, M. K., & Crosnoe, R. (2003). The Emergence and Development of life Course Theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the Life Course* (pp. 3-19). Berlin, Germany: Springer.

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multi-level models: A new look at an old issue. *Psychological Methods, 12,* 121-138. doi: 10.1037/1082-989x.12.2.121.

Fleming, T. M., Merry, S. N., Robinson, E. M., Denny, S. J., & Watson, P. D. (2007). Self-reported suicide attempts and associated risk and protective factors among secondary school students in New Zealand. *Australian and New Zealand Journal of Psychiatry, 41*, 213-221. doi: 10.1080/00048670601050481.

Fraser, M. (2004). The ecology of childhood multisystems perspective. In M. Fraser (Ed), *Risk and resilience in childhood: An ecological perspective,* 1-66. Washington, DC: NASW Press.

Fu, J. Z., & Fu, M. F. (2002). Rural girls' personalities and education policies. *Journal of Yunnan Normal University, 3*(6), 6-10.

Galambos, N., Barker, E. T., & Almeida, D. M. (2003). Parents do matter: Trajectories of change in externalizing and internalizing problems in early adolescence. *Child Development, 74*(2), 578-594. doi: 10.1111/1467-8624.7402017.

Galambos, N., Leadbeater, B., & Barker, E. (2004). Gender differences in and risk factors for depression in adolescence: A 4-year longitudinal study. *International Journal of Behavioral Development, 28*(1), 16-25. doi: 10.1080/01650250344000235.

Gansu Survey of Children and Families. (2010a). *Introduction.* Retrieved January 3, 2017, from https://china.pop.upenn.edu/gansu-survey-children-and-families-gscf

Gansu Survey of Children and Families. (2010b). *Research Site*. Retrieved January 3, 2017, from http://china.pop.upenn.edu/research-site

Gansu Survey of Children and Families. (2010c). *Statistics Bureau Sampling Memo.* Retrieved January 4, 2017, from http://china.pop.upenn.edu/documentation

Gansu Survey of Children and Families. (2010d). *Training Manual.* Retrieved January 4, 2017, from http://china.pop.upenn.edu/sites/www.pop.upenn.edu/files/gansu/GansuTrainingManualJune00.PDF

Garber, J. & Flynn, C. (2001). Vulnerability to depression in childhood and adolescence. In R.E. Ingram & J.M. Price. (Eds.), *Vulnerability to psychopathology: Risk*

across the lifespan (pp. 175-225). New York: Guilford Press.

Gazelle, H. (2006). Class climate moderates peer relations and emotional adjustment in children with an early history of anxious solitude: a child environment model. *Developmental Psychology, 42*(6), 1179-1192. doi: 10.1037/0012-1649.42.6.1179.

Ge, X., Conger, R. D., & Elder, G. H. (2001). Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. *Developmental Psychology, 37*, 404-417. doi: 10.1037//0012-1649.37.3.404.

Goodman, E., Huang, B., Wade, T. J., & Kahn, R. S. (2003). A multilevel analysis of the relation of socioeconomic status to adolescent depressive symptoms: does school context matter? *Journal of Pediatrics, 143*, 451-456. doi: 10.1067/S00223476(03)00456-6.

Graber, J. A., & Sontag, L. M. (2009). Internalizing problems during adolescence. In R.M. Lerner, & L. Steinberg (Eds.), *Handbook of adolescent psychology: Vol 1. Individual bases of adolescent development* (3rd ed., pp. 642-682). Hoboken, NJ: Wiley & Sons.

Greenberger, E., Chen, C., Tally, S.R., & Dong, Q. (2000). Family, peer, and individual correlates of depressive symptomatoloty among U.S. and Chinese adolescents. *Journal of Consulting and Clinical Psychology, 68*(2), 209-219. doi: 10.1037/0022 006X.68.2.209.

Hammen, C. L., & Rudolph, K. D. (2003). Childhood mood disorders. In E. J. Mash & R. A. Barkley (Eds.), *Child Psychopathology* (pp. 233-278). New York: Guilford Press.

Hankin, B. I., Abramson, L. Y., Moffitt, T. E., Silva, P. A., & McGee, R. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology, 107*, 128-140. doi: 10.1037/0021-843X.107.1.128.

Hannum, E., & Adams, J. (2008). Beyond cost: rural perspectives on barriers to education. In D. Davis & W. Feng (Eds.), *Creating Wealth and Poverty in China* (pp. 156-171). Palo Alto, CA: Stanford University Press.

Hannum, E., Kong, P., & Zhang, Y. (2009). Family sources of educational gender inequality in rural China: A critical assessment. *International Journal of Educational Development, 29*(5), 474–486. doi: 10.1016/j.ijedudev.2009.04.007.

Hawker, D. S., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry, 41*(4), 441-455. doi: 10.1111/14697610.00629.

Healy, L. M. (2008). *International social work: Professional action in an interdependent world*. Oxford University Press.

Ho, D. Y. F. (1986). Chinese patterns of socialization: A critical review. In M. H. Bond (Ed.), *The psychology of the Chinese people* (pp. 1–36). Hong Kong: Oxford University Press.

Hsu, J. (1985). The Chinese family: Relations, problems, and therapy. In W. S. Tseng & D. Y. H.Wu (Eds.), *Chinese culture and mental health* (pp. 95–112). Orlando, FL: Academic Press, Inc.

Jia, Y., Way, N., Ling, G., Yoshikawa, H., Chen, X., Hughes, D., Ke, X., & Lu, Z. (2009). The influence of student perceptions of school climate on socioemotional and academic adjustment: a comparison of Chinese and American adolescents. *Child Development, 80*(5), 1514-1530. doi: 10.1111/j.1467-8624.2009.01348.x.

Joyce, H. D., & Early, T. J. (2014). The impact of school connectedness and teachers support on depressive symptoms in adolescents: a multilevel analysis. *Children and Youth Services Review, 39*, 101-107. doi: 10.1016/j.childyouth.2014.02.005.

Kessler, R. C., Avenevoli, S., Costello, J., Georgiades, K., Green, J. G., Gruber, M. J., … & Merikangas, K. R. (2012). Prevalence, persistence, and sociodemographic correlates of DSM-IV disorders in the National Comorbidity Survey Replication Adolescent Supplement. *Archives of General Psychiatry, 69*, 372-380. doi: 10.1001/archgenpsychiatry.2011.160.

Kessler, R. C., Avenevoli, S., & Merikangas, K. R. (2001). Mood disorders in children and adolescents: An epidemiologic perspective. *Biological Psychiatry, 49*, 1002–1014. doi: 10.1016/S0006-3223(01)01129-5.

Kleinman, A. (1986). *Social origins of distress and disease: Depression, neurasthenia, and pain in modern China.* New Haven: Yale University Press.

Klomek, A. B., Marrocco, F., Kleinman, M., Schonfeld, I. S., & Gould, M. S. (2007). Bullying, depression, and suicidality in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 46*(1), 40-49. doi: 10.1097/01.chi.0000242237.84925.18.

Kuperminc, G. P., Leadbeater, B. J., & Blatt, S. J. (2001). School social climate and individual differences in vulnerability to psychopathology among middle school students. *Journal of School Psychology, 39*(2), 141-159. doi: 10.1016/s0022-4405(01)00059-0.

Lai, D. (2005). Sex ratio at birth and infant mortality rate in China: an empirical study. *Social Indicators Research, 70*(3), 313-326. doi: 10.1007/s11205-004-1542-y.

Lamborn, S. D., & Felbab, A. J. (2003). Applying ethnic equivalence and cultural values models to African American teens' perceptions of parents. *Journal of Adolescence, 26*, 605-622. doi: 10.1016/s0140-1971(03)00059-9.

Lau, S., Lew, W. J. F., Hau, K. T., Cheung, P. C., & Berndt, T. J. (1990). Relations among perceived parental control, warmth, indulgence, and family harmony of Chinese in Mainland China. *Developmental Psychology*, *26*, 674-677. doi: 10.1037/0012- 1649.26.4.674.

Letcher, P., Smart, D., Sanson, A., & Toumbourou, J. W. (2009). Psychosocial predictors and correlates of differing internalizing trajectories from 3 to 15 years. *Social Development,18*, 618–646. doi: 10.1111/j.1467-9507.2008.00500.x.

Lewinsohn, P., & Essau, C. (2002). Depression in adolescents. In Ian H. Gotleib & Constance L. Hammen (Eds.), *Handbook of Depression* (pp. 541-559). New York: Guilford Press.

Li, D., Bao, Z., Li, X., & Wang, Y. (2016). Perceived school climate and Chinese adolescents' suicidal ideation and suicide attempts: the mediating role of sleep quality. *Journal of School Health, 86*(2), 75-83. doi: 10.1111/josh.12354.

Liu, G. (2009). *Depression in China*. Retrieved September 20, 2017, from http://www.cuhk.edu.hk/ics/21c/media/articles/c114-200902032.pdf

Liu, X. (2003). *Parenting practices and the psychological adjustment of children in rural China* (Unpublished doctoral dissertation). Harvard University, Cambridge, MA.

Liu, Y., Li, X., Chen, L., & Qu, Z. (2015). Perceived positive teacher-student relationship as a protective factor for Chinese left-behind children's emotional and behavioral adjustment. *International Journal of Psychology, 50*(5), 354-362. doi: 10.1002/ijop.12112.

Loukas, A. & Robinson, S. (2004). Examining the moderating roles of perceived school climate in early adolescent adjustment. *Journal of Research on Adolescence, 14*(2), 209-233. doi: 10.1111/j.1532-7795.2004.01402004.x.

Luo, J., Gao, W., & Zhang, J. (2011). The influence of school relationships on anxiety and depression among Chinese adolescents whose parents are absent. *Social Behavior and Personality, 39*(3), 289-298. doi:10.2224/sbp.2011.39.3.289.

Malecki, C. K., & Demaray, M. K. (2002). Measuring perceived social support: Development of the child and adolescent social support scale (CASSS). *Psychology in the Schools, 1*, 1–18. doi:10.1002/pits.10004.

Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need?

Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School Psychology Quarterly, 18*(3), 231–252. doi: 10.1521/scpq/18.3.231.22576.

McKee, L., Roland, E., Coffelt, N., Olson, A. L., Forehand, R., Massari, C., … & Zens, M. S. (2007). Harsh discipline and child problem behaviors: The role of positive parenting and gender. *Journal of Family Violence, 22*(4), 187-196. doi: 10.1007/s10896-0079070-6.

McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007a). Examining the association between parenting and childhood anxiety: a meta-analysis. *Clinical Psychology Review, 27*, 155-172. doi: 10.1016/j.cpr.2006.09.002.

McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007b). Examining the association between parenting and childhood depression: a meta-analysis. *Clinical Psychology Review, 27*, 986-1003. doi: 10.1016/j.cpr.2007.03.001.

Meadows, S. O., Brown, J. S., & Elder, G. H. Jr. (2006). Depressive symptoms, stress, and support: Gendered trajectories from adolescence to young adulthood. *Journal of Youth and Adolescence, 35*(1), 93–103. doi: 10.1007/s10964-005-9021-6.

Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., Benjet, C., Georgiades, K., & Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication adolescent supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry, 49*(10), 980-989. doi: 10.1016/j.jaac.2010.05.017.

Merrell, K. W. (2013). *Helping students overcome depression and anxiety: A practical guide* (2nd ed.). New York, NY: Guilford Press.

Montague, M., Cavendish, W., Enders, C., & Dietz, S. (2010). Interpersonal relationships and the development of behavior problems in adolescents in urban schools: A longitudinal study. *Journal of Youth and Adolescence, 39*, 646-657. doi: 10.1007/s10964-0099440-x.

National Bureau of Statistics of China (2016). *China Statistical Yearbook 2016.* Retrieved January 10, 2017, from http://www.stats.gov.cn/tjsj/ndsj/2016/indexeh.htm

Needham, B. L. (2008). Reciprocal relationships between symptoms of depression and parental support during the transition from adolescence to young adulthood. *Journal of Youth and Adolescence, 37*, 893-905. doi: 10.1007/s10964-007-9181-7.

O'Connell, A. A., & McCoach, D. B. (Eds). (2008). *Multilevel modeling of educational data*. Charlotte, NC: IAP.

Perren, S., & Hornung, R. (2005). Bullying and delinquency in adolescence: victims'and perpetrators' family and peer relations. *Swiss Journal of Psychology, 64*(1), 51-64. doi:10.1024/1421-0185.64.1.51.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.

Reddy, R., Rhodes, J. E., & Mulhall, P. (2003). The influence of teacher support on student adjustment in the middle school years: A latent growth curve study. *Development & Psychopathology, 15*, 119–138. doi: 10.1017.S0954579403000075.

Rigby, K. (2000). Effects of peer victimization in schools and perceived social support on adolescent well-being. *Journal of Adolescence, 23*, 57-68. doi: 10.1006/jado.1999.2089.

Rozelle, S. J., Taylor, E., & deBrauw, A. (1999). Migration, remittances, and agricultural productivity in China. *The American Economic Review, 89*(2), 287–291. doi: 10.1257/aer.89.2.287.

Rueger, S. Y., Chen, P., Jenkins, L. N., Choe, H. J. (2014). Effects of perceived support from mothers, fathers, and teachers on depressive symptoms during the transition to middle school. *Journal of Youth and Adolescence, 43*, 655-670. doi: 10.1007/s109640130039-x.

Rueger, S. Y., Malecki, C. K., & Demaray, M. K. (2008). Gender differences in the relationship between perceived social support and student adjustment during early adolescence. *School Psychology Quarterly, 23*, 496–514. doi: 10.1037/1045-3830.23.4.496.

Rueger, S.Y., Malecki, C. K., & Demaray, M. K. (2010). Relationship between multiple sourcesof perceived social support and psychological and academic adjustment in early adolescence: comparisons across gender. *Journal of Youth and Adolescence, 39*, 47-61. doi: 10.1007/s10964-008-9368-6.

Rutter, M. (1979). Protective factors in children's responses to stress and disadvantage. In M. W. Kent & J. E. Rolf (Eds.), *Primary prevention of psychopathology: Vol. 3. Social competence in children* (pp. 49–74). Lebanon, NH: University Press of New England.

Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development, 81*, 6-22. doi: 10.1111/j.1467-8624.2009.01378.x.

Santos, J. R. A., Lippke, L., Pope, P. (1998). Proc Factor: A Tool for Extracting Hidden Gems from a Mountain of Variables. Proceedings of the annual SAS Global Forum.

SAS Institute Inc. (2013). SAS/STAT (Version 9.4) [Computer software]. Cary, NC: SAS Institute Inc.

Scaramella, L. V., Conger, R. D., & Simons, R. L. (1999). Parental protective influences and gender-specific increases in adolescent internalizing and externalizing problems. *Journal of Research on Adolescence, 9*(2), 111–141. doi: 10.1207/s15327795jra0902_1.

Schaefer, E. S. (1965). Children's reports of parental behavior: An inventory. *Child Development, 36*, 413–424. doi: 10.2307/1126465.

Shek, D. T. L. (2005). A longitudinal study of perceived family functioning and adolescent adjustment in Chinese adolescents with economic disadvantage. *Journal of Family Issues, 26*(4), 518-543. doi: 10.1177/0192513x04272618.

Shek, D. T. L., & Yu, L. (2011). A review of validated youth prevention and positive youth development programs in Asia. *International Journal of Adolescent Medicine and Health, 23*(4), 317-324. doi: 10.1515/IJAMH. 2011. 028.

Short, S., Zhai, F., Xu, S., & Yang, M. (2001). China's one-child policy and the care of children: An analysis of qualitative and quantitative data. *Social Forces, 79*(3), 913 944. doi: 10.1353/sof.2001.0025.

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis*. New York, NY: Oxford University Press.

Smith, P. K., & Brain, P. (2000). Bullying in school: Lessons from two decades of research. *Aggressive Behavior, 26*, 1-9. doi: 10.1002/(SICI)1098-2337(2000)26:13.0.CO;2-7.

Song, S., & Burgard, S. A. (2008). Does son preference influence children's growth in height?A comparative study of Chinese and Filipino. *Population Studies, 62*(3), 305-320. doi: 10.1080/00324720802313553.

Substance Abuse and Mental Health Services Administration. (2015). *Prevention and Behavioral Health.* Rockville, MD. Retrieved February 1, 2017 http://www.samhsa.gov/capt/practicing-effective-prevention/preventionbehavioralhealth/risk-protective-factors

Substance Abuse and Mental Health Services Administration. (2016). *Increasing Access to Behavioral Health Services and Supports through Systems of Care*. Retrieved February 1, 2017, from

https://www.samhsa.gov/sites/default/files/programs_campaigns/childrens_mental_health/awareness-day-2016-short-report.pdf

Tian, L., Liu, B., Huang, S., & Huebner, E. S. (2013). Perceived social support and school well-being among Chinese early and middle adolescents: the mediational role of self-esteem. *Social Indicators Research, 113,* 991-1008. doi: 10.1007/s11205-012-0123-8.

Turner, J. B., & Turner, R. J. (2013). Social relations, social integration, and social support. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health* (2nd ed., pp. 341-356). Dordrecht: Springer.

United Nations Children's Fund. (2013). *What census data can tell us about children in China: facts and figures 2013.* Retrieved March 1, 2017, from http://www.unicef.cn/en/uploadfile/2013/1216/20131216111141945.pdf

United Nations Population Fund. (2012). *Sex imbalances at birth: Current trends, consequences and policy implications.* Retrieved January 15, 2017, from http://www.unfpa.org/public/home/publications/pid/12405

van Dulmen, M. H., & Egeland, B. (2011). Analyzing multiple informant data on child and adolescent behavior problems: Predictive validity and comparison of aggregation procedures. *International Journal of Behavioral Development, 35*(1), 84–92. doi: 10.1177/0165025410392112.

Verhulst, F. C., Achenbach, T. M., van der Ende, J., Erol, N., Lambert, M. C., Leung, P. W. L., . . . Zubrick, S. R. (2003). Comparisons of problems reported by youths from seven countries. *American Journal of Psychiatry, 160*, 1479–1485. doi: 10.1176/appi.ajp.160.8.1479.

Walsemann, K. M., Bell, B. A., & Maitra, D. (2001). The intersection of school racial composition and student race/ethnicity on adolescent depressive and somatic symptoms. *Social Science and Medicine, 72*, 1873-1883. doi: 10.1016/j.socscimed.2011.03.033.

Wang, M. T. (2009). School climate support for behavioral and psychological adjustment: testing the mediating effect of social competence. *School Psychology Quarterly, 24*(4), 240-251. doi: 10.1037/a0017999.

Wang, Y. C. L., Chan, H. Y., Lin, C. W., & Li, J. R. (2015). Association of parental warmth and harsh discipline with developmental trajectories of depressive symptoms among adolescents in Chinese society. *Journal of Family Psychology, 29*(6), 895-906. doi: 10.1037/a0039505.

Wang, Z. Y., Lu, Y. C, Zhang, C. H., & Chen, Z. M. (2007). The comparison of personalities between urban and rural children. *Journal of Applied Clinic*

Pediatrics, 22(19), 1495-1496.

Watkins, N. D., & Aber, M. S. (2009). Exploring the relationships among race, class, gender,and middle school students' perceptions of school racial climate. *Equity and Excellence in Education, 42*(4), 395-411. doi: 10.1080/10665680903260218.

Way, N., Reddy, R., & Rhodes, J. (2007). Students' perceptions of school climate during the middle school years: Associations with trajectories of psychological and behavioral adjustment. *American Journal of Community Psychology, 40*, 194-213. doi: 10.1007/s10464-007-9143-y.

World Health Organization. (2010). *Health of adolescents in China*. Retrieved September 28, 2017 from http://www.wpro.who.int/topics/adolescent_health/china_fs.pdf

World Health Organization. (2012). *Depression: a global crisis.* Retrieved September 28, 2017, from http://www.who.int/mental_health/management/depression/wfmh_paper_depressionwmhd_2012.pdf

World Health Organization. (2016). *MhGAP Intervention Guide-Version 2.0 for mental, neurological and substance use disorders in non-specialized health settings.* Retrieved September 28, 2017, from http://apps.who.int/iris/bitstream/10665/250239/1/9789241549790-eng.pdf?ua=1

World Health Organization. (2017a). *Adolescent and Mental Health*. Retrieved September 28, 2017, from http://www.who.int/maternal_child_adolescent/topics/adolescence/mental_health/en/

World Health Organization. (2017b). *Child and Adolescent Mental Health*. Retrieved September 28, 2017, from http://www.who.int/mental_health/mhgap/cmh_slides.pdf?ua=1

World Health Organization. (2017c). *Depression and other common mental disorders: Global Health Estimates.* Retrieved September 28, 2017, from http://apps.who.int/iris/bitstream/10665/254610/1/WHO-MSD-MER-2017.2-eng.pdf

Wu, Q., Xie, B., Chou, C., Palmer, P. H., Gallaher, P. E., & Johnson, C. A. (2010). Understanding the effect of social capital on the depression of urban Chinese adolescents: an integrative framework. *American Journal of Community Psychology, 45*, 1-16. doi: 10.1007/s10464-009-9284-2.

Yang, C., Bear, G. G., Chen, F. F., Zhang, W., Blank, J. C., & Huang, X. (2013). Students' perceptions of school climate in the U.S. and China. *School Psychology Quarterly, 28*(1), 7-24. doi: 10.1037/spq0000002.

Yang, H. J., Soong, W. T., Kuo, P. H., Chang, H. L., & Chen, W. J. (2004). Using the CES-D in a two-phase survey for depressive disorders among nonreferred adolescents in Taipei: a stratum-specific likelihood ratio analysis. *Journal of Affective Disorders, 82*, 419-430. doi:10.1016/j.jad.2004.04.008.

Yi, C. C., Wu, C. I., Chang, Y. H., & Chang, M. Y. (2009). The psychological well-being of Taiwanese youth: school versus family context from early to late adolescence. *International Sociology, 24*(3), 397-429. doi: 10.1177/ 0268580909102914.

Yu, D. L., & Seligman, M. E. P. (2002). Preventing depressive symptoms in Chinese children. *Prevention & Treatment, 5*(1), Article ID 9. doi: 10.1037/15223736.5.1.59a.

Yue, Y. (in press). Ecological risk factors of depressive symptoms in Chinese youth: A literature review. *Global Journal of Human Social Sciences.*

Zahn-Waxler, C., Klimes-Dougan, B., & Slattery, M. J. (2000). Internalizing problems of childhood and adolescence: Prospects, pitfalls, and progress in understanding the development of anxiety and depression. *Development and Psychopathology, 12,* 443-466. doi: 10.1017/S0954579400003102

APPENDIX A

ANALYSIS OF MISSING DATA

Table A.1 *Frequency of Missing Variables Across Observations (n=1,173)*

Number of missing variables	Frequency	%
13	1	.09
9	25	2.13
8	57	4.86
4	1	0.09
2	3	0.26
1	75	6.39
0	1011	86.19

```
 10   0000000000000
  9   99999999
  9   77
  9   6666
  9   22
  9   1111
  8   9
  7   1111
  2   6
  2   333333
  2   0
  1   5555555
  1   4
  1   111111111111111111111111
  1   00000000
 -0   11111

      Multiply Stem.Leaf by 10**-1
```

Figure A.1 Stem-and-leaf display of correlations between missingness on variables (n=1,173)

```
 2   567
 1   0457
 0   77777
 0   6666
 0   555555555555555555
 0   444444444444444
 0   3333333333333333
 0   2222222222222
 0   1111111111111111111
 0   0000000000000000000000000000000000000000
-0   1111111111111111111
-0   22222222222222222222222
-0   333333333333333
-0   444444444
-0   555
-0   6666
-0   777777777777777777
-0   8
-0   9999999
-1   8
-6   8

     Multiply Stem.Leaf by 10**-1
```

Figure A.2 Stem-and-leaf display of correlations between missingness and observed values (n=1,173)

APPENDIX B

MEASUREMENTS

Items on Internalizing Problems (15 items). The following items are from the Child Survey (youth-report).

To what extent do you agree or disagree with following?

1. My classmates often make fun of me.
2. I can't do anything well unless adults are there.
3. I am often suspicious of others.
4. I prefer to be alone.
5. I can't concentrate on what I am doing.
6. I often feel nervous.
7. Sometimes my mood changes suddenly. I might be happy one moment and then I don't know why for some reason I suddenly can no longer feel happy.
8. I am often tired.
9. I always want to attract others attention.
10. There is always something to worry about.
11. I feel inferior to others.
12. I don't like to let others know about my affairs.
13. I do not feel sad, even if I have done something that I shouldn't have.
14. My future life won't be happy.
15. I blush easily.

Response Scale:
1=Totally disagree 2=Disagree 3=Agree 4=Fully agree

Items on Parental Warmth (8 items). The following items are from the Child Survey (youth-report).

How often do your parents treat you in the following ways?

1. If you have done something wrong, your parents will point it out.
2. When your school performance is poor, your parents encourage you to study harder.
3. Your parents often ask about school.
4. Your parents encourage you to think independently.
5. Your parents like to talk to you.
6. If you have done something wrong, your parents will ask you to explain the reason and then discuss with you the correct way to do it.
7. Your parents often ask about your homework.
8. When your parents ask you to do something, they tell you why.

Response Scale:
1=Never 2=Sometimes 3=Often

Items on Lack of Teacher Support (5 items reverse-coded). The following items are from the Child Survey (youth-report).

To what extent do you agree or disagree with following?

1. Teachers at our school care a lot about the students.
2. Teachers at our school treat students very fairly.
3. Teachers encourage us to ask questions.
4. Teachers like me.
5. The teaching quality at my school is very good.

Response Scale:
1=Totally disagree 2=Disagree 3=Agree 4=Fully agree

Items on Adverse Classroom Climate (6 items). The following items are from the Child Survey (youth-report).

How often the following things ever happened in your school?

1. Students copy others' homework.
2. During tests, students cheat by referring to their books or copying from others' answers.
3. There are fights between students.
4. Students disrupt the class.
5. Students bully other students.
6. Students violate school discipline.

Response Scale:
1=Never 2=Sometimes 3=Often

APPENDIX C

INVESTIGATION OF MODEL ASSUMPTIONS

Table C.1 *Tolerance Values for Each Variable Included in the Growth Curve Model*

Variable	Tolerance value
Level-1 Model	
Age	.84
Level-2 Model	
Gender	.99
Academic performance	.97
Father's education	.97
Family structure	.99
Family SES	.99
Parental warmth	.91
Lack of teacher support	.93
Adverse classroom climate	.85

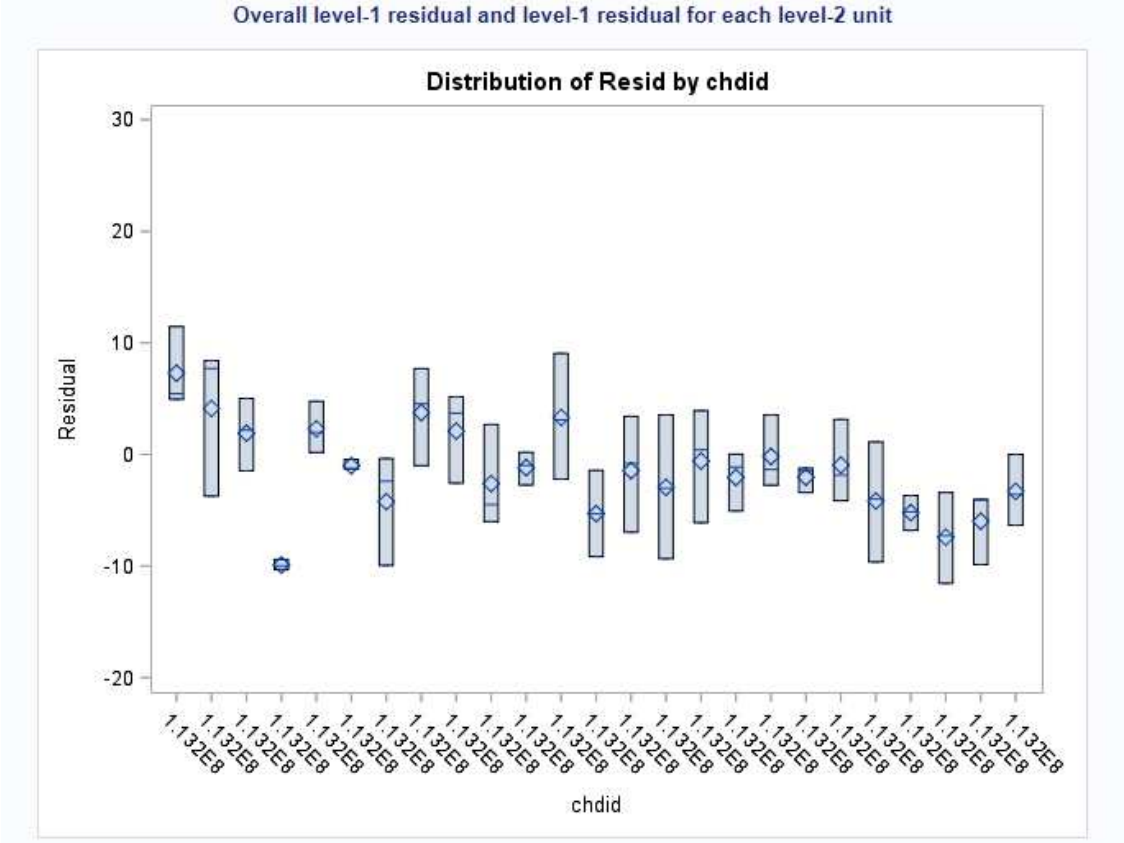


Figure C.1 Distribution of Level-1 residuals: Overall residual and for each Level-2 unit (the first plot in the series)

Normality summary statistics for the overall residual and each level-2 unit

Level-2 Unit	Skewness	Kurtosis	Shapiro-Wilk	p-value	Variance	Std Dev	N
1.132E8	0.1747	-0.3290	0.9830	0.0270	25.1020	5.0102	180
1.133E8	0.0282	-0.0324	0.9857	0.1408	27.6811	5.2613	144
1.234E8	-0.4746	0.0481	0.9677	0.0003	27.0880	5.2046	186
1.335E8	0.2215	2.1687	0.9682	0.0001	35.0087	5.9168	210
1.336E8	-0.2087	-0.6065	0.9772	0.1141	15.0366	3.8777	90
1.437E8	0.2495	1.2918	0.9776	0.0016	27.3366	5.2284	216
1.438E8	0.1268	0.0915	0.9898	0.1282	29.0490	5.3897	216
1.439E8	-0.2152	0.9098	0.9657	0.0000	40.6650	6.3769	234
1.54E8	1.2666	4.2213	0.9184	0.0000	29.1195	5.3963	138
1.541E8	0.0881	-0.0489	0.9744	0.0084	39.3346	6.2717	144
1.642E8	0.1101	0.8591	0.9815	0.0491	47.7851	6.9127	144
1.643E8	-0.1164	-0.1042	0.9799	0.0185	44.5090	6.6715	162
1.744E8	0.4523	0.3577	0.9299	0.0011	36.2499	6.0208	66
1.745E8	-0.0967	-1.0542	0.9617	0.0024	33.4706	5.7854	114
1.746E8	1.1479	1.5550	0.9119	0.0000	30.1977	5.4952	96
1.847E8	-0.1776	-0.6567	0.9709	0.0309	17.3900	4.1701	96
1.848E8	0.3710	0.5843	0.9776	0.0993	17.4602	4.1785	96
1.849E8	0.3056	-0.1819	0.9824	0.1928	52.3267	7.2337	102
1.95E8	0.0031	-0.2941	0.9821	0.0947	27.1289	5.2085	126
1.951E8	1.3777	4.7828	0.9092	0.0000	38.3032	6.1890	168
2.052E8	-0.0996	-0.0550	0.9911	0.2067	36.1131	6.0094	216
2.053E8	0.3411	-0.4417	0.9738	0.0117	33.2334	5.7648	132
2.154E8	-0.5033	1.0392	0.9662	0.0055	19.3338	4.3970	114
2.155E8	0.1625	-0.1014	0.9521	0.0007	12.5964	3.5491	108
2.156E8	0.1092	0.2851	0.9719	0.0166	49.9408	7.0669	114
2.257E8	1.2099	4.0280	0.9032	0.0000	36.0677	6.0056	168
2.358E8	0.0277	0.4364	0.9904	0.3406	36.7259	6.0602	162
2.359E8	0.0936	0.2608	0.9889	0.0748	31.4762	5.6104	228
2.46E8	0.4491	1.5170	0.9722	0.0004	28.6290	5.3506	210
2.461E8	0.4776	0.2641	0.9668	0.0035	41.4927	6.4415	126
2.562E8	0.3072	0.3456	0.9671	0.0066	34.1220	5.8414	114
2.563E8	1.1206	1.8506	0.9222	0.0000	33.4983	5.7878	108
2.664E8	0.2427	-0.9184	0.9658	0.0021	42.5207	6.5208	132
2.665E8	-0.1369	1.1961	0.9665	0.0275	25.8162	5.0810	84
2.666E8	-0.5491	0.0187	0.9645	0.0401	26.8540	5.1821	72
2.767E8	0.1906	0.3051	0.9887	0.0870	31.9590	5.6532	216
2.868E8	-0.1838	0.4520	0.9832	0.3454	26.5012	5.1479	84
2.869E8	0.6662	0.3564	0.9600	0.0025	27.5031	5.2443	108
2.97E8	-0.3918	-0.4373	0.9707	0.0060	26.3778	5.1359	132
2.971E8	-0.0220	-0.7544	0.9779	0.0296	14.5796	3.8183	132
2.972E8	0.1062	-0.5308	0.9850	0.1789	25.8788	5.0871	126
3.073E8	0.4019	1.2023	0.9712	0.0030	28.8956	5.3755	150

Figure C.2 Partial output from MIXED_DX normality summary table for Level-1 residuals: Overall and for each Level-2 unit

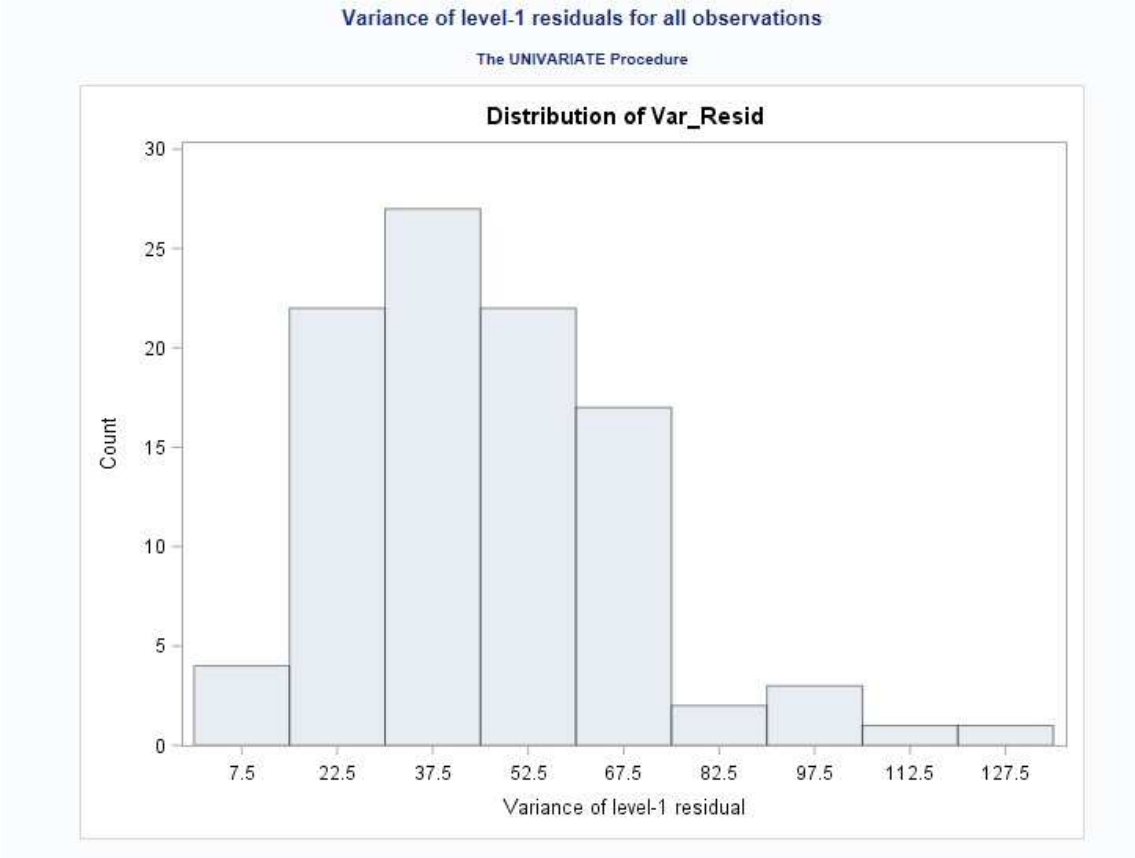
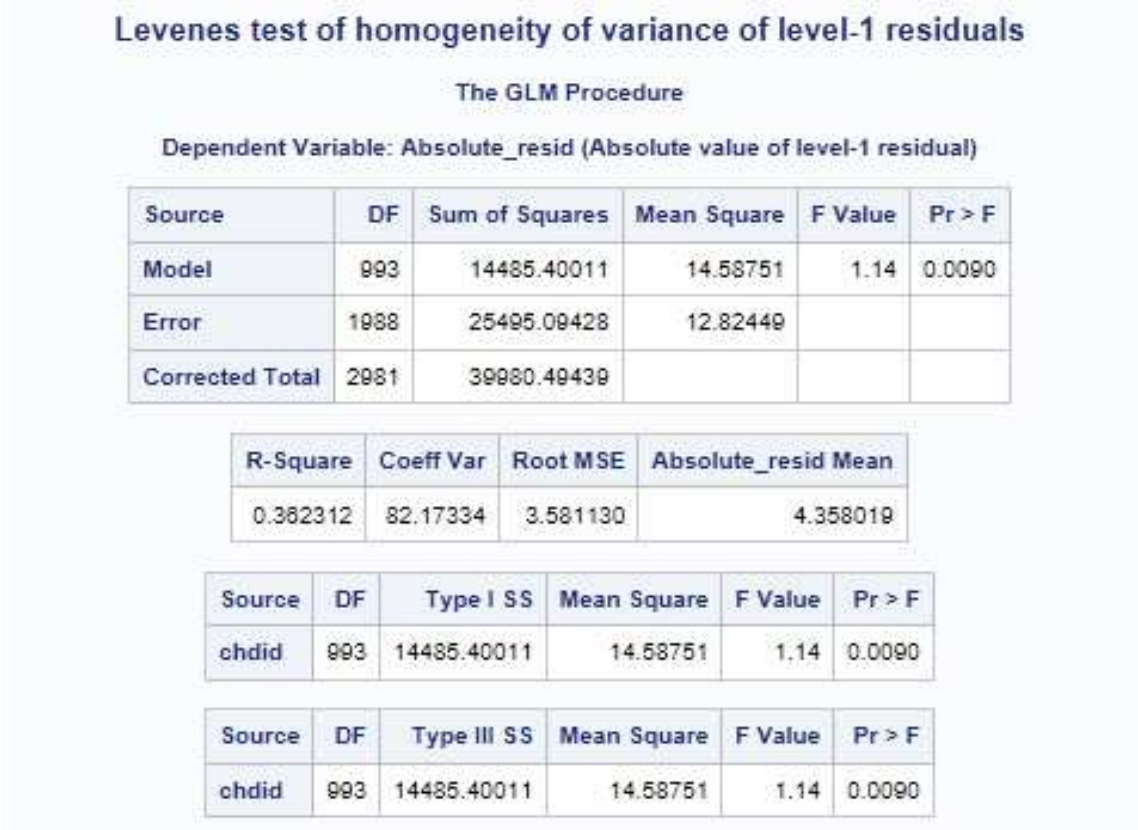


Figure C.3 Distribution of the variance of Level-1 residuals for all observations



Levenes test of homogeneity of variance of level-1 residuals

The GLM Procedure

Dependent Variable: Absolute_resid (Absolute value of level-1 residual)

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	993	14485.40011	14.58751	1.14	0.0090
Error	1988	25495.09428	12.82449		
Corrected Total	2981	39980.49439			

R-Square	Coeff Var	Root MSE	Absolute_resid Mean
0.362312	82.17334	3.581130	4.358019

Source	DF	Type I SS	Mean Square	F Value	Pr > F
chdid	993	14485.40011	14.58751	1.14	0.0090

Source	DF	Type III SS	Mean Square	F Value	Pr > F
chdid	993	14485.40011	14.58751	1.14	0.0090

Figure C.4 MIXED_DX output for Levene's homogeneity of variance test of Level-1 residuals

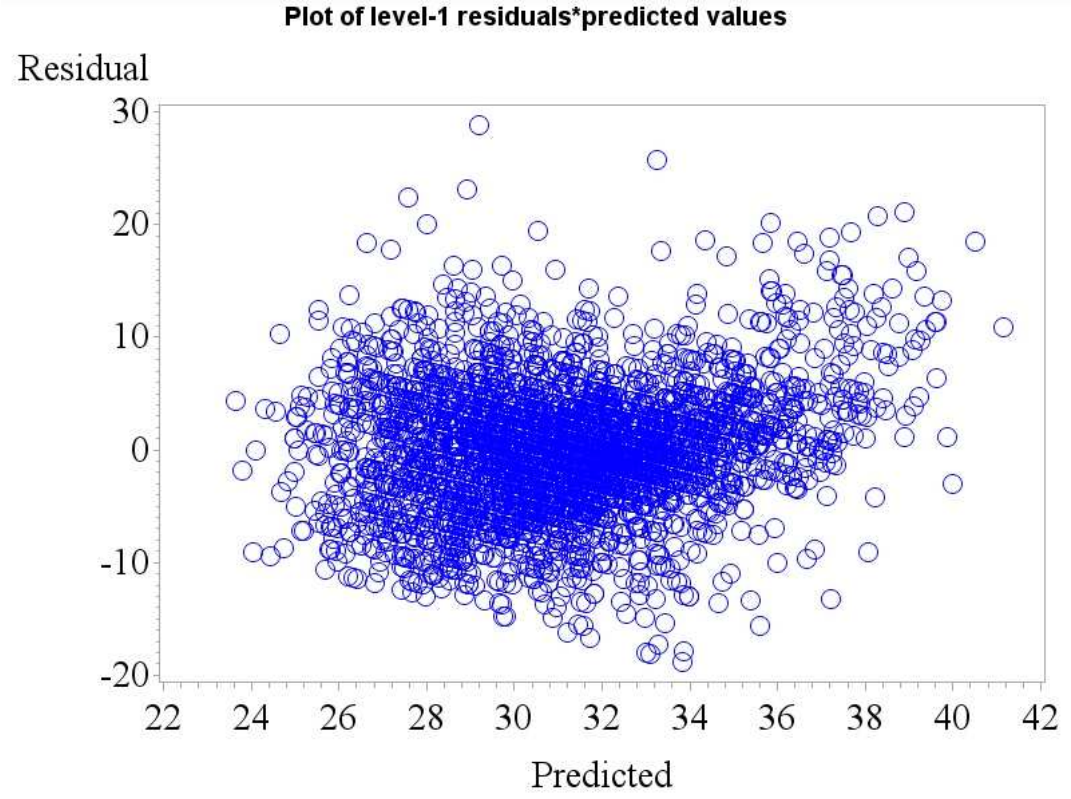


Figure C.5 Level-1 residuals*predicted value for all observations

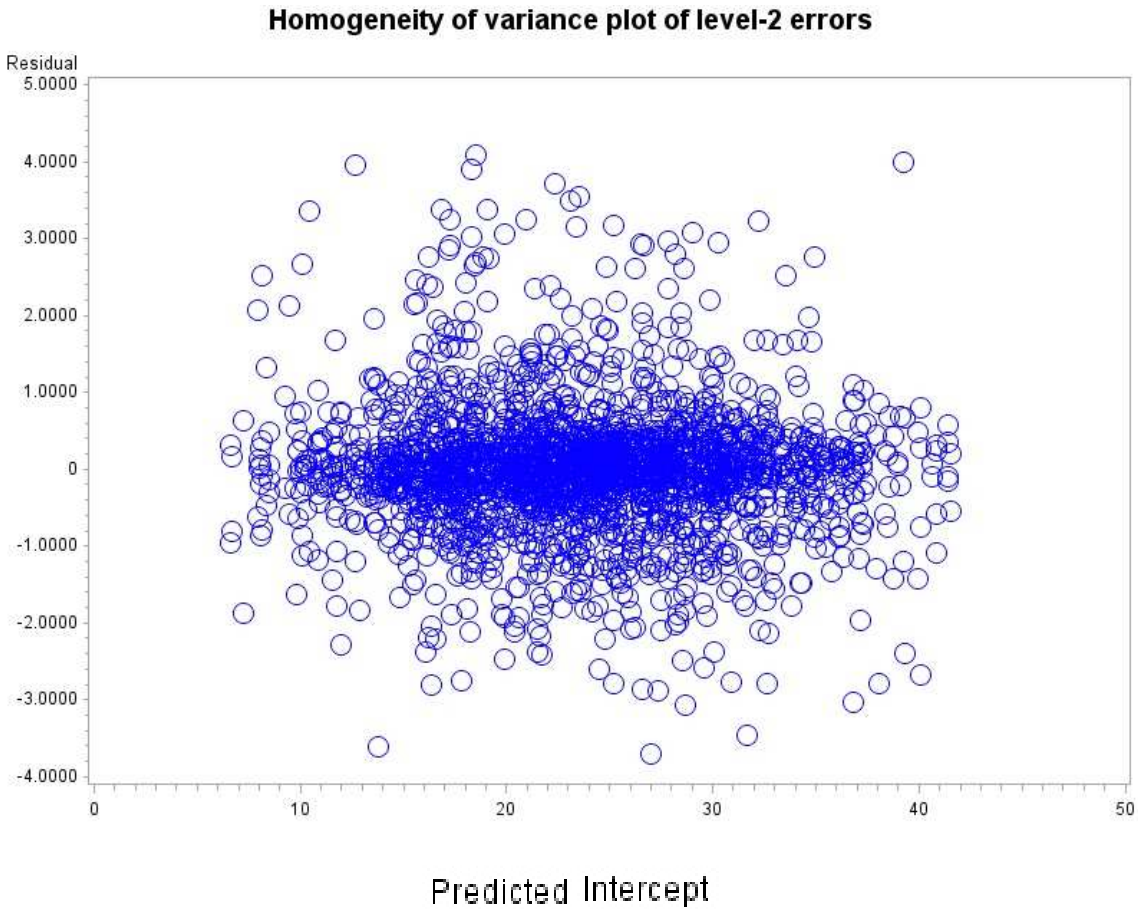


Figure C.6 Level-2 residual*predicted intercept value for all Level-2 units

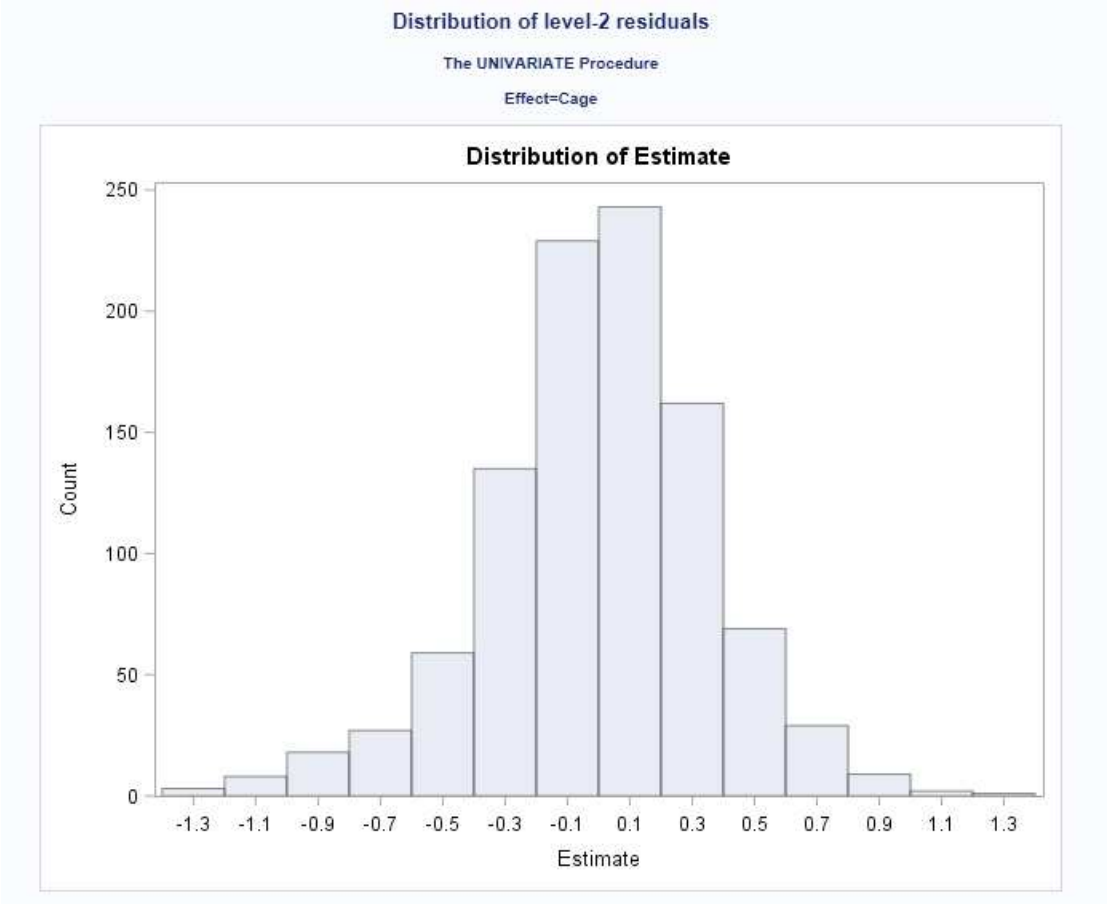


Figure C.7 Distribution of Level-2 residuals

```
Multivariate normality and outlier assessment
--------------------------------------------
Multivariate Skewness:
         b1p =              0.14128933
         Chi-Square =       23.5248638
         df =                        4
         p-value =          0.00009944

Multivariate Kurtosis:
         b2p =              9.38448649
         Z (Upper) =        5.45622069
         p-value (Upper) =  2.43188E-8
         Z (Lower) =        5.35836908
         p-value (Lower) =  0.99999996

Largest Mahalanobis Distance:
         Level 2 Unit =     225681181
         D-Squared =        19.4344068
         F =                9.90137699
         df numerator =              2
         df denominator =          991
         p-value            0.00005524
```

Figure C.8 MIXED-DX output for Level-2 multivariate normality and outlier assessment

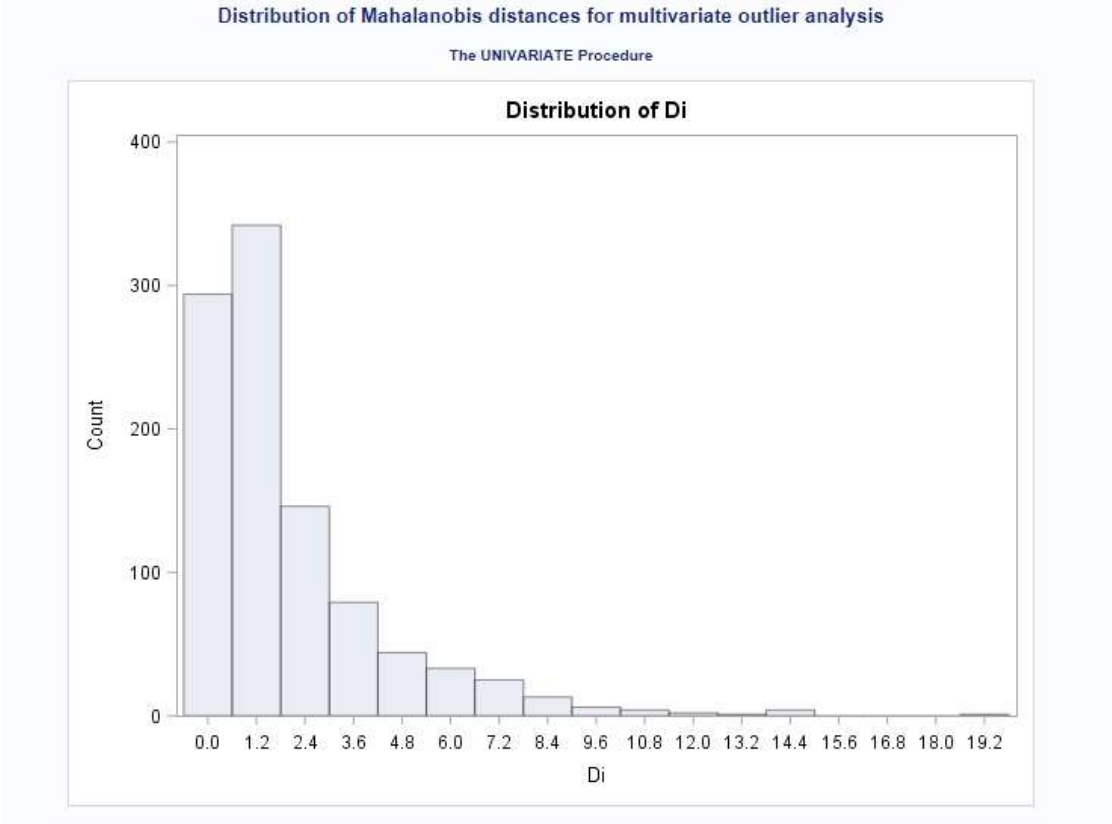


Figure C.9 Distribution of Mahalanobis distance values for each Level-2 unit

Ranked influence diagnostics

Obs	chdid	flags	Nobs	Iter	CookD	MDFFITS	CovRatio	CovTrace	CookDCP	MDFFITSCP	CovRatioCP	CovTraceCP	PRESS	RMSE	RLD
1	307282171	10	3	2	0.00946	0.00936	0.9639	0.0364	0.07942	0.08107	0.9737	0.0263	752.24	7.12444	0.2127
2	133483161	9	3	2	0.00662	0.00661	0.9564	0.0443	0.14856	0.15217	0.9833	0.0164	1215.42	7.05991	0.2404
3	143785221	9	3	2	0.00348	0.00349	0.9670	0.0335	0.04002	0.04067	0.9755	0.0246	796.55	7.11444	0.0850
4	143890191	9	2	2	0.00650	0.00650	0.9575	0.0433	0.05674	0.05806	0.9625	0.0378	893.59	7.11548	0.1443
5	143890231	9	3	2	0.00268	0.00269	0.9676	0.0328	0.03785	0.03829	0.9787	0.0214	729.50	7.09430	0.0778
6	164182231	9	3	2	0.01175	0.01174	0.9596	0.0409	0.08218	0.08393	0.9635	0.0367	1210.42	7.10221	0.2473
7	174586151	9	3	2	0.01018	0.01014	0.9642	0.0363	0.05664	0.05794	0.9775	0.0225	960.32	7.12072	0.2086
8	184886111	9	3	2	0.00431	0.00432	0.9513	0.0497	0.09705	0.09893	0.9709	0.0293	1214.46	7.07554	0.1545
9	184886231	9	3	2	0.00642	0.00646	0.9152	0.0882	0.11691	0.11964	0.9596	0.0408	1283.12	7.09727	0.2098
10	205182181	9	3	2	0.00334	0.00334	0.9825	0.0175	0.04167	0.04230	0.9832	0.0167	625.08	7.12777	0.0893
11	205284231	9	3	2	0.00417	0.00417	0.9631	0.0374	0.04416	0.04490	0.9795	0.0205	678.43	7.12174	0.1075
12	215382171	9	3	2	0.01402	0.01402	0.9441	0.0573	0.11676	0.11910	0.9681	0.0319	1151.89	7.07418	0.3099
13	215585221	9	3	2	0.00393	0.00393	0.9493	0.0518	0.07028	0.07164	0.9738	0.0262	767.87	7.12301	0.1283
14	215586241	9	3	2	0.00387	0.00386	0.9810	0.0191	0.02697	0.02727	0.9883	0.0117	606.71	7.12637	0.0833
15	225683171	9	3	2	0.01864	0.01845	0.9649	0.0355	0.05702	0.05814	0.9714	0.0288	1085.47	7.11309	0.3256
16	235782261	9	3	2	0.00671	0.00674	0.9276	0.0747	0.12425	0.12832	0.9534	0.0470	1005.82	7.11772	0.2240
17	235884301	9	2	2	0.00340	0.00341	0.9439	0.0575	0.07335	0.07535	0.9500	0.0507	776.46	7.11449	0.1192
18	245982231	9	3	2	0.00588	0.00586	0.9634	0.0372	0.04182	0.04228	0.9764	0.0237	896.64	7.09897	0.1228
19	246084121	9	3	2	0.00514	0.00513	0.9668	0.0336	0.03848	0.03900	0.9844	0.0155	741.71	7.12307	0.1092
20	246084401	9	3	2	0.00421	0.00423	0.9567	0.0440	0.06897	0.07077	0.9681	0.0320	972.69	7.11954	0.1183
21	246085311	9	3	2	0.00379	0.00381	0.9458	0.0555	0.08504	0.08680	0.9720	0.0281	734.41	7.12197	0.1404
22	256181181	9	3	2	0.01711	0.01695	0.9532	0.0475	0.12186	0.12634	0.9448	0.0559	1178.55	7.11594	0.3582
23	256181281	9	2	2	0.00459	0.00458	0.9688	0.0316	0.02450	0.02477	0.9760	0.0241	681.01	7.10978	0.0910
24	256284321	9	3	2	0.01318	0.01313	0.9595	0.0412	0.06549	0.06682	0.9549	0.0456	1093.41	7.10441	0.2554
25	266381231	9	3	2	0.00277	0.00279	0.9436	0.0578	0.08194	0.08384	0.9697	0.0305	846.39	7.12338	0.1230

Figure C.10 Partial output from MIXED_DX ranked influence diagnostics summary table for each Level-2 unit